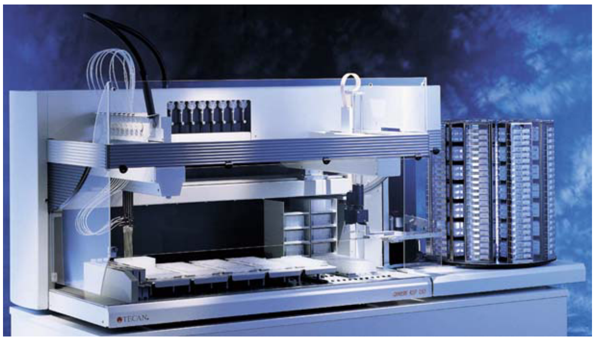
TECAN.

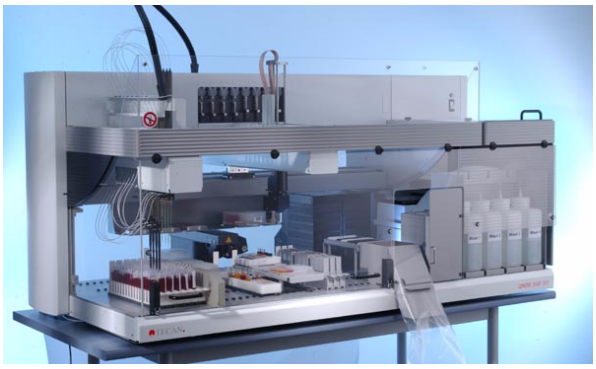
Service Manual

Genesis RSP Instrument



Genesis RWS Logistics Workstation

Genesis RWS Assay Workstation



Genesis RMP Instrument

Doc ID 391895 Version 1.0, August 2002

Customer Support Tecan Schweiz AG and its representatives maintain a fully trained staff of technical specialists around the world. For any technical question, contact your nearest Tecan representative or:

TECAN Schweiz AG	Telephone	+41 1 922 81 11
Seestrasse 103	Telefax	+41 1 922 81 12
CH-8708 Männedorf	E-mail	info@tecan.com
	Internet	www.tecan.com
Expertline	Telephone	+41 1 922 81 81
	Telefax	+41 1 922 84 84
	E-mail	expertline-eu@tecan.com

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1 About This Manual

Purpose of This Chapter

This chapter points out the purpose of the manual, specifies the instruments the manual deals with and for whom the manual is intended. Furthermore, it contains a list with relevant reference documents, explains the symbols, conventions and abbreviations used and offers general information.

Introduction

The structure and contents of this manual were compiled based on the results of a worldwide survey between Tecan field service engineers. We hope the manual fits your requirements and would be happy to get any feedback. Just contact the documentation service group of Tecan Schweiz AG.

Applicability

The instructions given in this document are applicable for Genesis Instruments type …

- Genesis RSP
- Genesis RWS Logistics
- Genesis RWS Assay
- Genesis RMP

Purpose of This Document

This document serves as a reference guide for Tecan trained and authorized personnel only. It provides all relevant information for installation and servicing of the instrument – with exception of information covered by the respective reference documents (see section 'Reference Documents' later in this chapter).

Target Groups

This manual addresses the following target groups:

Target group	Description	Tasks/responsibilities
Field service engineer	Experienced field service engineer who has visited a Tecan service training and has been authorized for servicing the Genesis RSP, RMP and RWS instruments.	• Site inspection • Installation • Commissioning • Site acceptance • Maintenance • Repair • Calibration
System integrator	A legal person (e.g. a RO within Tecan group or a distributor) who acts in a legal sense between Tecan Schweiz AG (manufacturer of sub-assembly) and end-user.	• Conformity assessment and CE marking (see Section 4.5).

Reference Documents

The following documents are helpful for installation and servicing of the instrument. They are not enclosed with this manual, nevertheless they are part of the service documentation.

Document type	Valid for …/document title	Doc ID
Operating Manual	Genesis RSP and NPS	Doc ID 390 783
	Genesis RMP	I 119 100
	Genesis RWS	Doc ID 391 197
	Carousel	Doc ID 391 209
	Columbus Washer	I 109 004
	Sunrise Reader	I 137 301
	Spectra & Rainbow Readers	I 139 003
Instrument Software Manual	Genesis Instrument	Doc ID 390 791
Installation Manual	Lower DiTi eject option 2	Doc ID 391 276
	Low volume option 1: tube fastening	Doc ID 391 228
	Access option/Signal lamp (RSP, RWS)	Doc ID 392 330
	Door lock V2 (RMP)	Doc ID 391 260
	Alarm device V2 (RMP)	Doc ID 391 255
Form or Checklist	Decontamination Declaration	Doc ID 390 901
	Genesis Maintenance and Service Logbook, including:	Doc ID 390 924
	• Installation Qualification	Doc ID 391 180
	• Operation Qualification	Doc ID 391 182
	• Acceptance Protocol	Doc ID 391 825
	• Daily/Weekly Maintenance Checklist	Doc ID 391 193
	• Preventive Maintenance Checklist	Doc ID 391 181
	• Service Checklist	Doc ID 391 183

Furthermore, you may find following Application Software Manuals useful:

Area of application	Application software	Doc ID
Diagnostics	TOPS	I 117 578
	Logic	Doc ID 391 110
Life Science	FACTS	Doc ID 391 252
	Gemini	Doc ID 391 201

Symbols Used in This Manual

Safety Symbols

The safety symbols are explained in Chapter 2, ‘Safety’.

Useful Notes

Useful notes appear as follows:

Note

Gives helpful information about the equipment or regarding proceedings, tentative clarifications etc.

Instrument Overviews

In Chapter 8, ‘Instruments at a Glance’ you will find useful illustrations of the instruments giving an overview of the main components.

On the detail drawings and the text passages in this document (mainly in Chapter 6, ‘Replacement of Spare Parts, Repair’), one main part is always designated with the identical item number – for example (8) for LiHa – as on the relevant illustration in chapter 8. Item numbers of their components consist always of the main part item number, a dash and the item number of the component – for example (8-04) for LiHa backplane.

Abbreviations and Acronyms Used in This Manual

FaWa	Fast wash pump
FSE	Field service engineer
FWO	Fast wash option
ILID	Integrated liquid detection
LICOS	Liquid container supervisor
LiHa	Liquid handling arm
MP	Micro plate
MPO	Monitored pump option
PCB	Printed circuit board
PosID	Positive identification option, barcode reader
RMP	Robotic microplate processor
RoMa	Robotic manipulator arm
RSP	Robotic sample processor
RWS	Robotic workstation

2 Safety

Purpose of This Chapter

This chapter contains specific rules of behavior and warnings from hazards with regard to installation, setup, maintenance and repair of the Genesis RSP, RMP or RWS instruments.

Significance of These Safety Instructions

The safety of users and personnel can only be ensured if these safety instructions and the safety-related warnings in the individual chapters are strictly observed and followed.

Therefore, the Service Manual must always be available to all persons performing the tasks described herein.

In addition to the safety instructions given in this Service Manual, the safety instructions pointed out in the Operating Manuals of the Genesis RSP, RMP or RWS instruments apply as well.

2.1 User Qualification

FSE Authorization

The field service engineers (FSE) are specially trained personnel. Exclusively FSEs are entitled to perform the maintenance and service work described in this Service Manual.

The manufacturer Tecan authorizes the FSEs if they fulfill the following particular qualifications:

- They must have received appropriate service and operator training from Tecan.
- They must be familiar with the good laboratory practice guidelines.
- They must have read and understood the instructions in this Service Manual.

2.2 Notices and Symbols

2.2.1 Warning Notices Used in This Manual

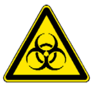
The symbols used for safety-related notices have the following significance:

WARNING Symbols

⚠ **WARNING**

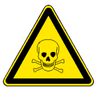
Generally, the triangular warning symbol indicates the possibility of personal injury or even loss of life if the instructions are not followed.

Whenever possible, the symbol indicates the hazard a person is exposed to more specifically. The symbols used in this Service Manual have the following significance:



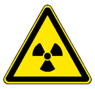
WARNING

Biological hazard



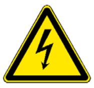
WARNING

Chemical hazard



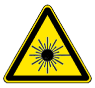
WARNING

Radioactive radiation



WARNING

Electrical danger

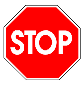


WARNING

Laser radiation

ATTENTION Symbols

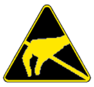
ATTENTIONS appear as follows:



ATTENTION

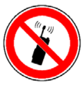
With the general “STOP” symbol, ATTENTIONs indicate the possibility of equipment damage, malfunctions or incorrect process results, if instructions are not followed.

Other symbols indicate the significance of the ATTENTION more specifically.



ATTENTION

Damage to electronics by electrostatic discharge.
Always follow ESD safety practices.

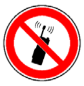


ATTENTION

Disturbance of functions by electromagnetic RF waves.
Do not use a cellular phone.

2.2.2 Warning Notices Attached to the Product or Its Surroundings

Cellular Phones Prohibited



Do not use cellular phones in the proximity of the instrument.

This symbol is attached to the safety panel of the instrument. The symbol must also be attached to the laboratory door.

Damaged or fallen off symbols (notices or stickers) must be replaced immediately.

2.3 Use of the Product

Intended Use

The Genesis RSP, RMP or RWS instruments are to be applied and used exclusively in the following application fields. Any other use is considered improper and is strictly forbidden.

- The Genesis RSP is intended for liquid pipetting for generally known laboratory methods according to common safety precautions.
- The Genesis RMP is intended for fully automated processing of 96-well microplate based ELISA (Enzyme Linked Immuno Sorbent Assay) and ELISA-like tests, starting from sample pipetting and ending with result reading.
  All ELISA test procedures have to be validated prior to performing routine tests.
- The Genesis RWS Logistics is intended for pipetting tasks as well as storage, identification and transfer of microplates. It is to be applied for research only.
  The Genesis RWS Logistics is intended to be part of a liquid handling system and as such installed and put into operation by a trained Tecan or Tecan authorized system integrator.
- The Genesis RWS Assay is intended for processing of microplate based tests, including liquid handling, incubation, wash, read and data acquisition. It is to be applied for research only.
  The Genesis RWS Assay is intended to be part of a liquid handling system and as such installed and put into operation by a trained Tecan or Tecan authorized system integrator.

All Genesis instruments are intended for indoor operation and storage only.

Improper Use

Due to their open architecture, the Genesis RWS Assay and Logistics are not intended for clinical and diagnostic applications. These applications would be carried out by less qualified people, exposing them to dangerous liquids in case of instrument malfunction.

Incorrect use of the Genesis RMP may lead to false test results and may cause exposure of the operator to potentially dangerous compounds.

Do not attempt to use liquids with undissolved particles as this could result in liquid not being dispensed due to clogged tips.

2.4 Product Safety

Principle

The Genesis RSP, RMP or RWS instruments are designed and built in accordance with the present state-of-the-art technology and the recognized technical safety regulations.

Nevertheless, risks to users, property, and the environment can arise when the instrument is used carelessly or improperly.

The manufacturer has determined all residual dangers emanating from the instrument in all life phases and from the process.

Appropriate warnings in the Operating Manuals of the Genesis RSP, RMP or RWS instruments and in this Service Manual serve to make the user alert to these residual dangers.

2.4.1 Instrument-Related Hazards and Safety Measures

Pay attention to the following safety notices:

WARNING

Electrical shock hazard.
Switch the instrument off and disconnect from mains whenever no power is required to perform service tasks.

ATTENTION

Crimping of the tubing between top cover and case possible.
Secure the top cover from falling down during inspection work.

ATTENTION

Damage to the electronic boards due to electrostatic discharge (ESD).
Always wear a wrist strap when handling the boards.

2.4.2 Other Hazards and Safety Measures

WARNING

- Chemical, biological and radioactive hazards can be associated with the substances used or the samples processed with the Genesis RSP, RMP or RWS instrument.
- The same applies to waste disposal.

Always be aware of possible hazards associated with these substances.

Request a filled out and signed Decontamination Declaration prior to performing any maintenance or repair tasks.

2.4.3 Safety Elements

Removal of Protective Devices

The protective and safety devices installed on the Genesis RSP, RMP or RWS instrument must be neither removed nor disabled during operation.

If such elements were removed, e.g. for maintenance work, operation may only be resumed when all protective and safety devices have been completely installed and checked.

2.5 Decontamination

When to Decontaminate

Apart from regular decontamination, the user must thoroughly decontaminate the instrument according to standard laboratory regulations in the following cases:

- Before any maintenance or service work is performed on the instrument
- Before a Tecan field service engineer (FSE) performs any in-site work on the instrument
- Before the instrument is returned to Tecan (e.g. for repair)
- Prior to storage of the instrument
- Prior to disposal of the instrument or parts of it
- Generally before the instrument or parts of it leave the user’s site.

Decontamination Method

The decontamination method must be adapted to the respective application and the substances associated with it. The user takes the full responsibility for the appropriate decontamination of the entire equipment.

WARNING

Biological or chemical hazard and/or radioactive radiation.

- Contamination hazard due to parts of the instrument which are not completely decontaminated.
- Mind that not only the parts having direct contact with chemicals or biological material must be treated, but also the tubing system as well as the whole upstream equipment.

Decontamination Declaration

Before a Tecan FSE carries out any work on the instrument, or before the instrument is returned to Tecan, the owner of the instrument must confirm in writing that the decontamination has been performed properly and in accordance with good laboratory practice guidelines. For this, the owner must enclose a Decontamination Declaration form (Doc ID 390 901), which can be provided by Tecan.

Note: Tecan will refuse any instrument or a part of it, if the decontamination form is not filled in and duly signed.

2.6 General Safety Rules

Legal Regulations Legal regulations, such as local, state and federal laws which prescribe the use or application as well as the handling of dangerous materials in connection with the Genesis RSP, RMP or RWS instrument must be strictly followed.

Duty of Maintenance and Care The user is responsible for ensuring that the Genesis RSP, RMP or RWS instrument is operated in proper condition only, and that maintenance, service, and repair jobs are performed with care and on schedule.

Appropriate Behavior Use exclusively tools suitable for the respective work sequence. Ensure that the tools are in sound condition.

Handling and disposing of waste has to be in accordance with all local, state and federal environmental, health, and safety laws and regulations.

Spare Parts to Be Used Use only genuine spare parts for maintenance and repair.

Modifications Modifications to the Genesis RSP, RMP or RWS instrument are only permitted with the written approval of the manufacturer. Modifications and upgrades shall only be carried out by an authorized field service engineer. The manufacturer will decline any claim resulting from unauthorized modifications.

3 Product Description

Purpose of This Chapter

This chapter summarizes the technical data of the Genesis instruments and contains an overview of requirements, hardware, software and firmware compatibilities.

Note

For detailed information concerning optional modules as reader, washer, carousel etc., refer to their respective manuals.

Chapter Overview

This chapter consists of the following sections:

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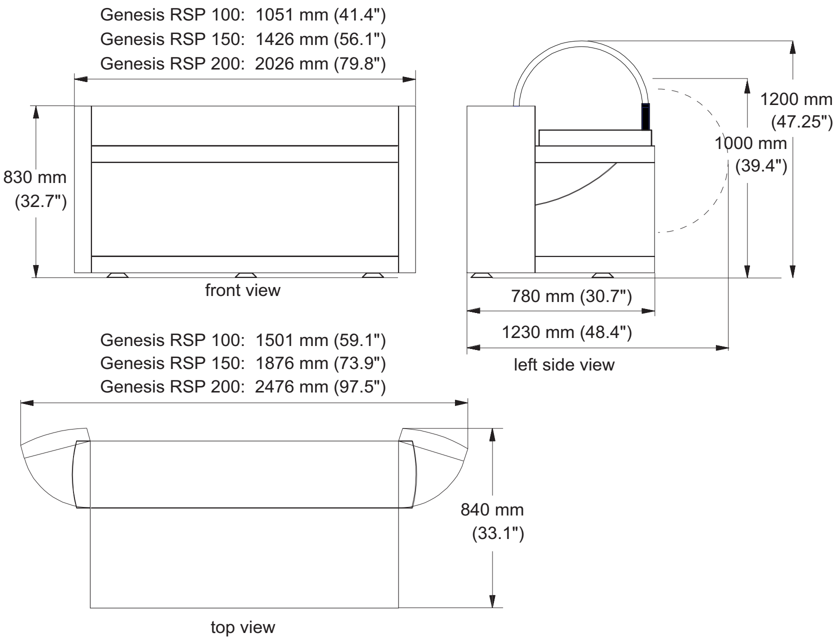
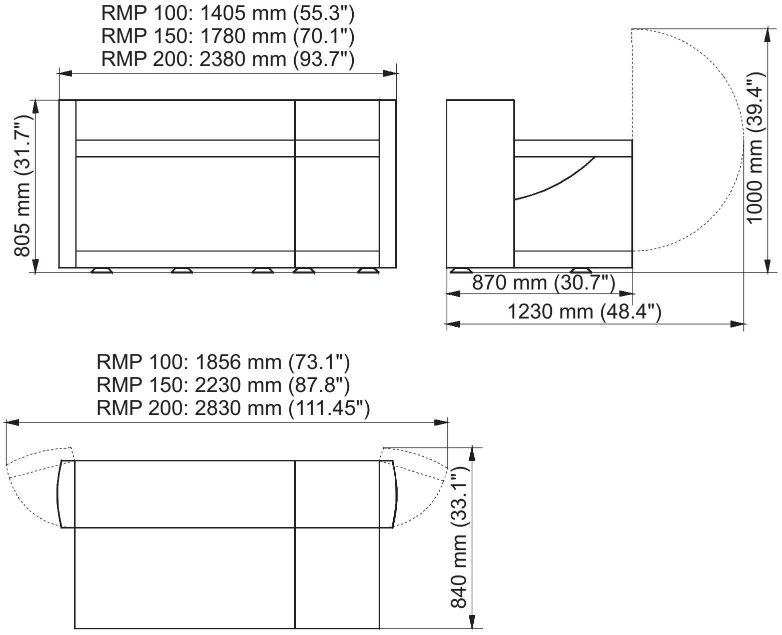
3.1 Technical Data and Requirements

3.1.1 Dimensions and Weights

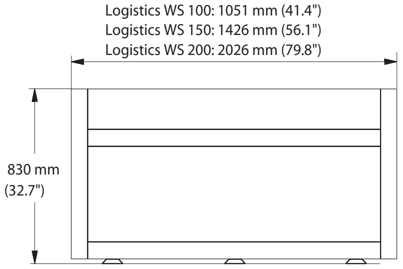
RSP Instrument Dimensions


Genesis RSP 100: 1051 mm (41.4")
Genesis RSP 150: 1426 mm (56.1")
Genesis RSP 200: 2026 mm (79.8")
830 mm
(32.7")
front view
1200 mm
(47.25")
1000 mm
(39.4")
780 mm (30.7")
1230 mm (48.4")
left side view
Genesis RSP 100: 1501 mm (59.1")
Genesis RSP 150: 1876 mm (73.9")
Genesis RSP 200: 2476 mm (97.5")
840 mm
(33.1")
top view

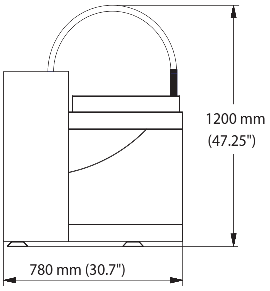
RMP Instrument Dimensions


RMP 100: 1405 mm (55.3")
RMP 150: 1780 mm (70.1")
RMP 200: 2380 mm (93.7")
805 mm (31.7")
1000 mm (39.4")
870 mm (30.7")
1230 mm (48.4")
RMP 100: 1856 mm (73.1")
RMP 150: 2230 mm (87.8")
RMP 200: 2830 mm (111.45")
840 mm (33.1")

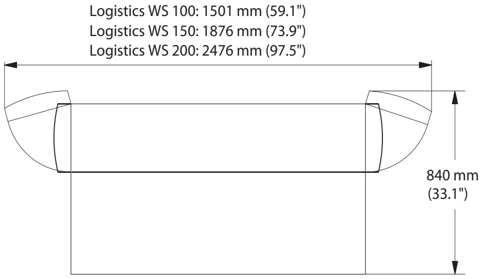
RWS Logistics Workstation Dimensions


Logistics WS 100: 1051 mm (41.4")
Logistics WS 150: 1426 mm (56.1")
Logistics WS 200: 2026 mm (79.8")
830 mm
(32.7")

Front View

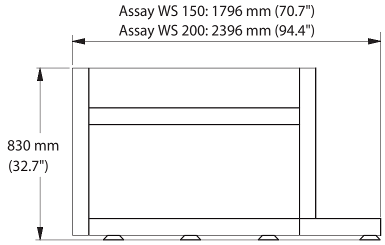

1200 mm
(47.25")
780 mm (30.7")

Left Side View

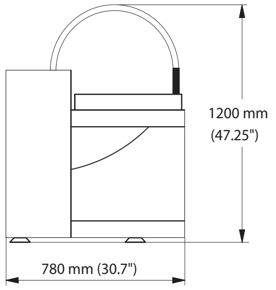

Logistics WS 100: 1501 mm (59.1")
Logistics WS 150: 1876 mm (73.9")
Logistics WS 200: 2476 mm (97.5")
840 mm
(33.1")

Top View

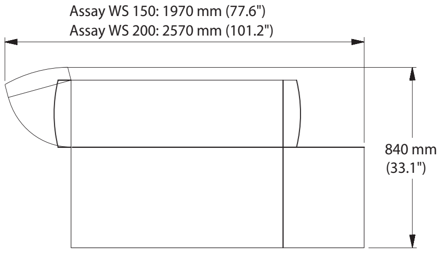
RWS Assay Workstation Dimensions


Assay WS 150: 1796 mm (70.7")
Assay WS 200: 2396 mm (94.4")
830 mm
(32.7")

Front View

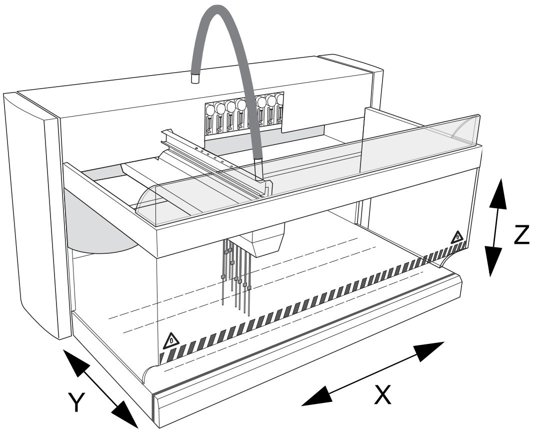

1200 mm
(47.25")
780 mm (30.7")

Left Side View


Assay WS 150: 1970 mm (77.6")
Assay WS 200: 2570 mm (101.2")
840 mm
(33.1")

Top View

Worktable Dimensions



Genesis RSP

		RSP 100	RSP 150	RSP 200
Accessible X-range (X-travel)	mm	745	1120	1720
	inch	29.3	44.1	67.7
Accessible Y-range (Y-travel)	mm	418	418	418
	inch	16.5	16.5	16.5
Grid positions on worktable	pcs.	30	45	69

Genesis RMP

		RMP 100	RMP 150	RMP 200
Accessible X-range (X-travel)	mm	550	925	1525
	inch	21.6	36.4	60
Accessible Y-range (Y-travel)	mm	418	418	418
	inch	16.5	16.5	16.5
Grid positions on worktable	pcs.	24	39	63

Genesis RWS

RWS Logistics		100	150	200
Accessible X-range (X-travel)	mm	745	1120	1720
	inch	29.3	44.1	67.7
Accessible Y-range (Y-travel)	mm	418	418	418
	inch	16.5	16.5	16.5
Grid positions on worktable	pcs.	30	45	69

RWS Assay			**150**	**200**
Accessible X-range (X-travel)	mm		925	1525
	inch		36.4	60
Accessible Y-range (Y-travel)	mm		418	418
	inch		16.5	16.5
Grid positions on worktable	pcs.		43	67

Weights

Genesis RSP

		RSP 100	**RSP 150**	**RSP 200**
Platform with 4-tip/8-tip LiHa 2	kg	96/103	115/122	165/172
	lb.	212/227	253/269	364/379
RoMa 2	kg	6	6	6
	lb.	13	13	13
PosID 2 option	kg	8	11	14
	lb.	18	24	31
MPO or FWO	kg	2	2	2
	lb.	4.4	4.4	4.4
Packing	kg	35	47	71
	lb.	77	104	156

Genesis RMP

		RMP 100	**RMP 150**	**RMP 200**
Platform with LiHa 2, RoMa 2 and PosID 2	kg	166	188	241
	lb.	366	414	531
FWO	kg	2	2	2
	lb.	4.4	4.4	4.4
Packing	kg		43	99
	lb.		95	218

Genesis RWS

Logistics		**100**	**150**	**200**
Platform with 4-tip/8-tip LiHa 2 and RoMa 2	kg	104/111	123/130	173/180
	lb.	229/245	271/287	381/397
PosID 2 option	kg	8	11	14
	lb.	18	24	31

Logistics		**100**	**150**	**200**
MPO or FWO	kg	2	2	2
	lb.	4.4	4.4	4.4
Packing	kg	35	47	71
	lb.	77	104	156

Assay			**150**	**200**
Platform with 4-tip/8-tip LiHa 2 and RoMa 2	kg		131/138	181/188
	lb.		289/304	397/414
PosID 2 option	kg		11	14
	lb.		24	31
MPO or FWO	kg		2	2
	lb.		4.4	4.4
Packing	kg		50	74
	lb.		110	163

3.1.2 Supply Ratings

Genesis RSP

Supply ratings		**RSP 100**	**RSP 150/200**
Primary voltage	V AC	100–240	100–240
Frequency	Hz	50/60	50/60
Power	VA	800	800
Module type (for power module supplied as of September 2001)		PM 1	PM 4

Genesis RMP

Supply ratings		**RMP 100/150/200**
Primary voltage	V AC	100–240
Frequency	Hz	50/60
Power	VA	1000

Genesis RWS

Supply ratings		**RWS 100** Logistics	**RWS 150/200** Assay/Logistics
Primary voltage	V AC	100–240	100–240
Frequency	Hz	50/60	50/60
Power	VA	800	1200
Module type (for power module supplied as of September 2001)	VA	PM 1	PM 2

3.1.3 Environmental Conditions

Operating Conditions

The Genesis RSP, RMP or RWS instruments are intended for indoor operation and storage only.

		RSP	**RMP**	**RWS**
Operating temperature	°C	15–32	18–30	18–30
	°F	59–90	65–86	65–86
Operating humidity relative (non condensing) at 30 °C/86 °F or below	%	30–80	30–80	30–80
Pollution degree		2	2	2
Over voltage category	class	2	2	2

Storage Conditions

Protect the instrument against dust and debris with a cover.

Recommendation: store the instrument in its original packaging. Store all manuals and the Service and Maintenance Logbook with the instrument.

		RSP	**RMP**	**RWS**
Storage temperature	°C	1–60	1–60	1–60
	°F	34–140	34–140	34–140
Storage humidity relative (non condensing) at 30 °C/86 °F or below	%	30–80	30–80	30–80

3.1.4 Computer and Software Requirements

Computer Hardware

Refer to the Genesis Instrument Software Manual for details on minimum computer requirements.

Software

It is strongly recommended to use the latest software versions. Please contact your nearest Tecan representative for more information.

Software	RSP	RMP	RWS Logistics	RWS Assay
Operating System	X X	X X	X X	X X
Genesis Instrument Software	X	X	X	X
Logic (Clinical Diagnostics)	X			
Gemini (Life Science)	X		X	X
TOPS (Operating SW)		X		
FACTS (Event scheduling SW)			X	X
TAURUS (Database for Clinical Diagnostics)	X			
Magellan (Data reducing SW)		X		

X = required or available for respective instrument

3.1.5 Additional Data for System Modules

LiHa 2

- 4 or 8 tips (diluters) acting independently
- Variable tip spacing: 9–38 mm
- Arm movement speed: 300–500 mm/s
- Positioning precision: better than 0.4 mm

RoMa 2

- Transports any rack in MP-format
- Arm movement speed: 400 mm/s
- Rotation: 270°

- Lifting force: up to 4 N (transportable mass up to 0.4 kg
- Software adjustable gripper force: 1–4 N
- Gripper space range 55 to 140 mm

PosID 2

- Laser class 2
- Wave length: 670 nm
- Distinction between sample barcode/no barcode/no tube
- Reads vertically and horizontally
- Movement speed: 400 mm/s
- Barcode types:
  Code 39 (length 0...32)
  Code 39 full ASCII
  Codabar (length 0...32)
  Code 128 (length 0...32)
  2/5 Interleaved (length 0...30, even only)
  UPC-A (length not setable: 12)
  UPC-E (length not setable: 8)
  EAN-8 (length not setable: 8)
  EAN13 (length not setable: 13)

3.2 Compatibility Matrix

Tecan customer support provides a compatibility maxtrix which displays the most common configurations that may be installed presently on your customer’s systems. Please request your up-to-date copy via expertline-eu@tecan.com.

4 Transport and Installation

Purpose of This Chapter This chapter summarizes the procedures needed for installation of a Genesis RSP, RMP or RWS instrument from site inspection to site acceptance.

Chapter Overview This chapter consists of the following sections:

Section	Title	Page
4.1	Site Inspection	4 – 1
4.2	Transport	4 – 2
4.3	Installation	4 – 3
4.3.1	Unpacking and Positioning	4 – 3
4.3.2	RMP Specific Installation Tasks	4 – 3
4.3.3	RWS Specific Installation Tasks	4 – 13
4.3.4	Further Options and Modules for RSP/RWS	4 – 14
4.3.5	Computer, Software	4 – 15
4.4	Commissioning	4 – 16
4.5	Conformity Assessment and CE Marking for RWS	4 – 18
4.6	Site Acceptance	4 – 18

4.1 Site Inspection

Site Requirements Check the customer’s site for site requirements suitable concerning the respective instrument:

Notice the dimensions and weights of the different instruments (see section 3.1.1).

Delivery Route

- Loading dock present?
- Load capacity and size of elevator sufficient?
- Door and entrance openings, passageway corners: big enough?

Environmental Requirements

- Check according to Section 3.1.3, ‘Environmental Conditions’.

Space

- Enough space to place instrument and possible extensions?
- Enough space to open safety panels and access doors of the instrument?
- Enough walking space around the instrument?
- Space for placing system liquid/waste bottles?
- Enough space for the control computer?

Supply

Notice the power supply requirements (refer to section Section 3.1.2, 'Supply Ratings')

Check presence of power sockets for

- Instrument
- Computer
- Other modules

Date of Delivery

- Determine the date of delivery.

4.2 Transport

General Notes

- The Genesis RSP, RMP and RWS are precision instruments. Handle with care. Do not expose to excessive shock.
- Always use original packaging for shipping the instrument.

Visual Check

- Visually check the crate(s) for damage sustained during transportation. If such are found, the customer must immediately file a complaint with the transport agency.
- Tecan instrument packaging is designed to avoid damage during transportation. Please inform Tecan about all occurrences of transportation damages. Such information is important for further improvements.

4.3 Installation

4.3.1 Unpacking and Positioning

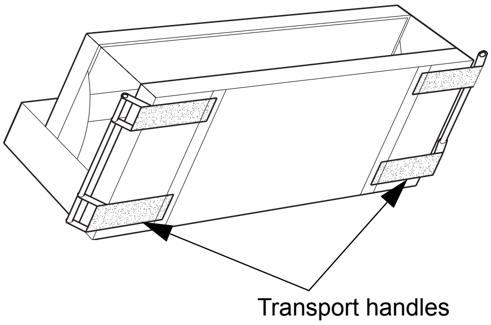


Figure 4-1 Transport handles – seen from below

1. Unpack all components and visually check for any damage. Leave transport paddings and moorings in place.
2. Check if the shipment is in compliance with the packing list.
3. Lift the instrument onto the assigned work bench and place it as required.

STOP

- *For exact positioning: always lift the instrument; do not shift it.*
- *Because of the considerable weight of the instrument (see Section 3.1.1, 'Dimensions and Weights'), up to four people are required for lifting the instrument. The center of gravity is at the rear right side of the instrument. Make sure that the two strongest persons lift the rear of the instrument.*
- *Use the optional transport handles (see Figure 4-1). Never lift the instrument by the lateral worktable covers. The screws holding the covers are not designed to support the instrument weight.*

4. Remove all transport paddings and moorings.

   Packing material shall be stored for possible shipment of parts to be repaired by manufacturers.

4.3.2 RMP Specific Installation Tasks

Add-On Module

Only the RMP 200 has a separate add-on module. RMP 100 and 150 consist of one-piece frames. Therefore, following procedure applies to RMP 200 only.

Refer to Figure 4-2, 'RMP 200' and Figure 4-3, 'Add-on module assembly'.

1. Place a spirit level onto the RMP worktable and level horizontally by means of the supports below the instrument frame.
2. Connect the add-on module (15) to the right side of the RMP 200.
   There are two positioning pins (15-01) in the add-on module frame and two positioning holes in the instrument frame.

   While positioning the add-on module, lead the cables for the mains power switch and the control lamp trough the upper left part of the add-on module.

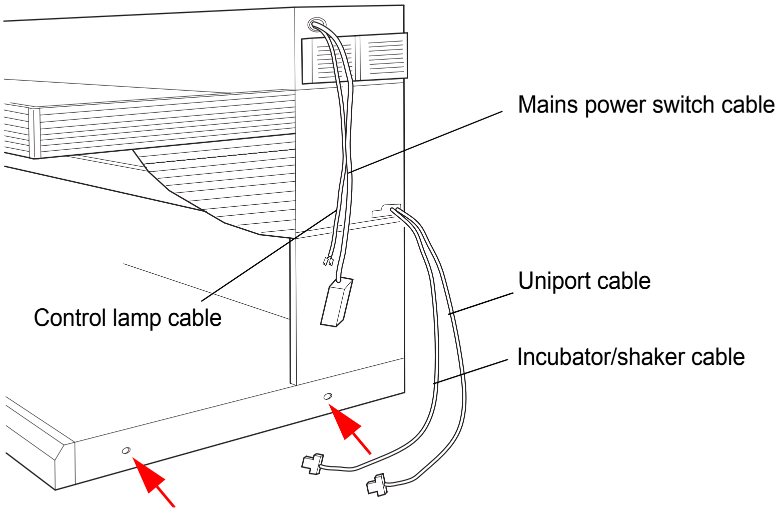

Mains power switch cable
Uniport cable
Control lamp cable
Incubator/shaker cable

Figure 4-2 RMP 200

3 Turn the two left supports (15-02) to their topmost positions, so that they do not touch the work bench. The add-on module is now sitting on its two right supports with the two positioning pins connected to the RMP 200.

4 Turn the two left supports down until they touch the work bench.

5 Insert the module worktable (15-03).

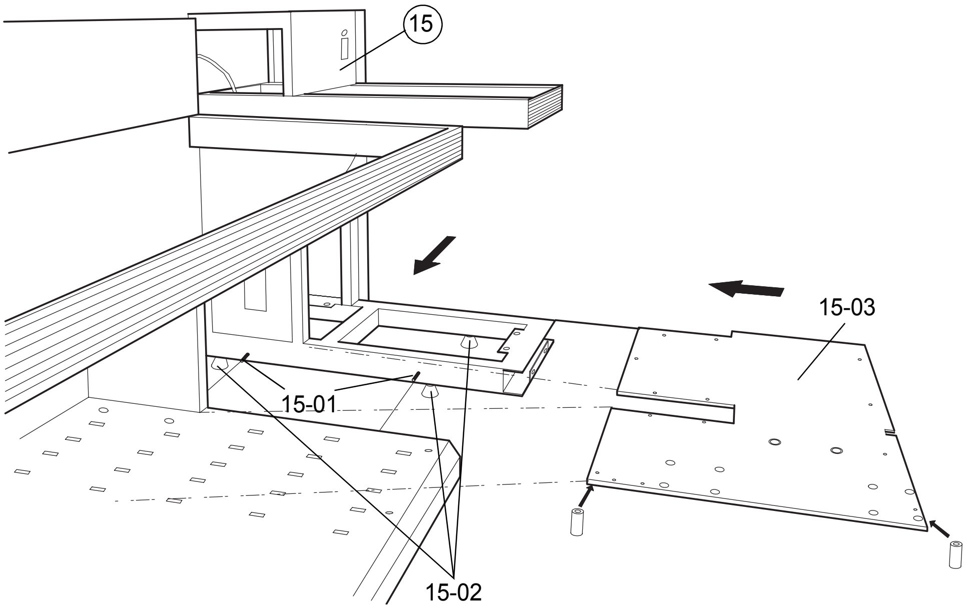

15
15-03
15-01
15-02

Figure 4-3 Add-on module assembly

15	Add-on module
15-01	Positioning pin
15-02	Support
15-03	Module worktable

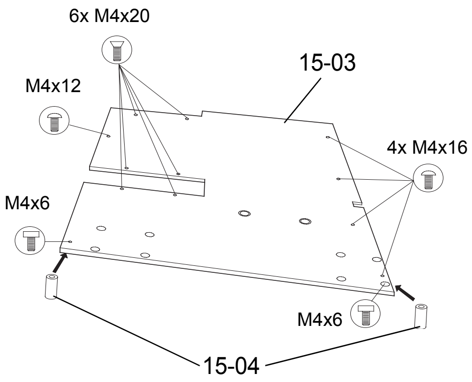


Figure 4-4 Module worktable

6 Insert the fixing screws and the two distance washers (15-04) according to Figure 4-4. Tighten the fixing screws.

7 Check horizontal alignment with a spirit level; if necessary, adjust by means of the two right supports (15-02).

15-03	Module worktable
15-04	Distance washer

Set the mains power switch to off and disconnect the mains power connection of the instrument before performing any further work!

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

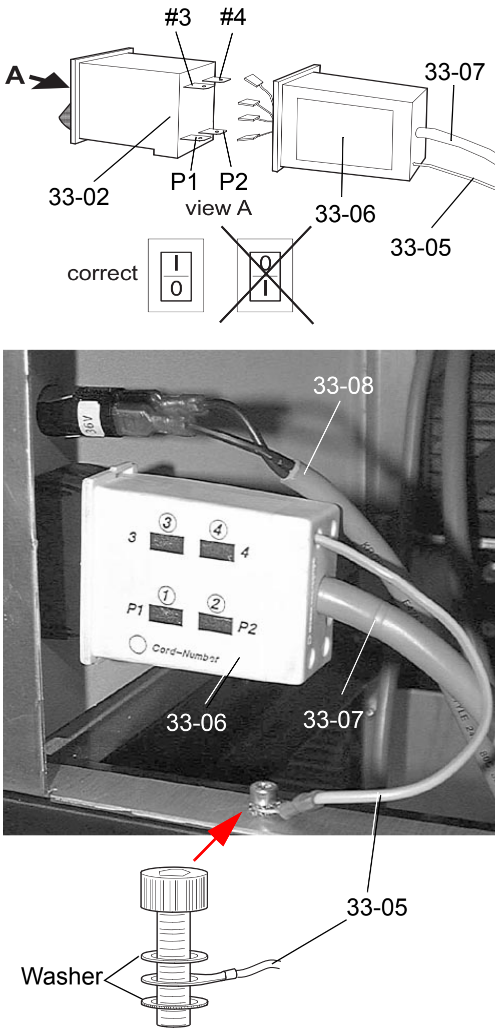


Figure 4-5 Electric connections for RMP

8 Open the right access door (6) and install the mains power switch (33-02) into the add-on module.
Note the correct orientation of the switch according to Figure 4-5!

9 Connect the mains power cable (33-07) to the power switch (33-02) according to the installation diagram (33-06) on the housing.

10 Fix the earth cable (33-05) to the add-on module frame as shown in Figure 4-5.

11 Connect the control lamp cable (33-08) to the power control lamp in the add-on module.

12 Connect the Uniport cable coming from the Optibo to the Uniport (see Figure 4-6, 'Cable connections on Supervisor and Uniport board').
The Uniport is located in the rear part of the add-on module.

33-02	Power switch
33-05	Earth cable
33-06	Installation diagram
33-07	Mains power cable
33-08	Control lamp cable

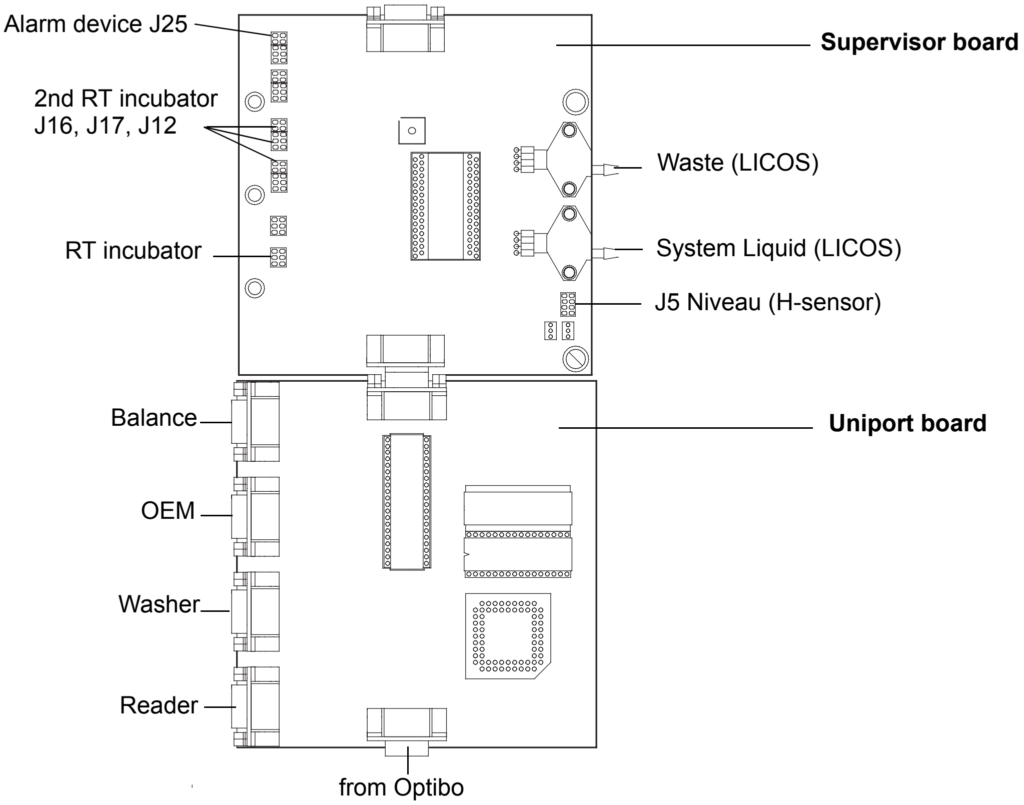

Alarm device J25
2nd RT incubator
J16, J17, J12
RT incubator
Supervisor board
Waste (LICOS)
System Liquid (LICOS)
J5 Niveau (H-sensor)
Balance
OEM
Washer
Reader
Uniport board
from Optibo

Figure 4-6 Cable connections on Supervisor and Uniport board

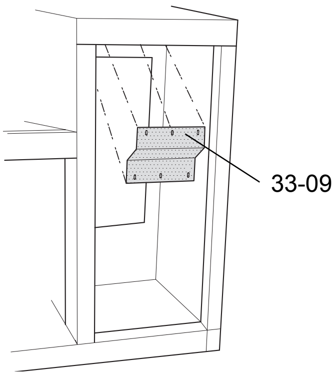


Figure 4-7 Connector sheet

13 Fix the connector sheet (33-09).
The connector sheet guarantees a proper electromagnetic compatibility (EMC).

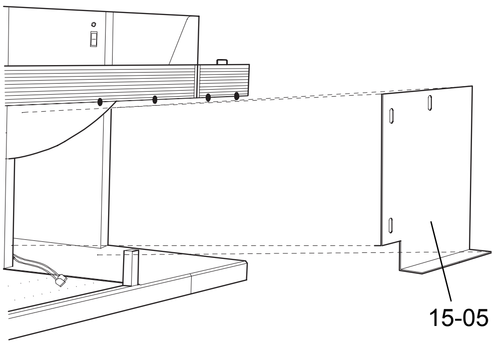


Figure 4-8 Module cover

14 Insert and fix the module cover (15-05).

Reader (Option)

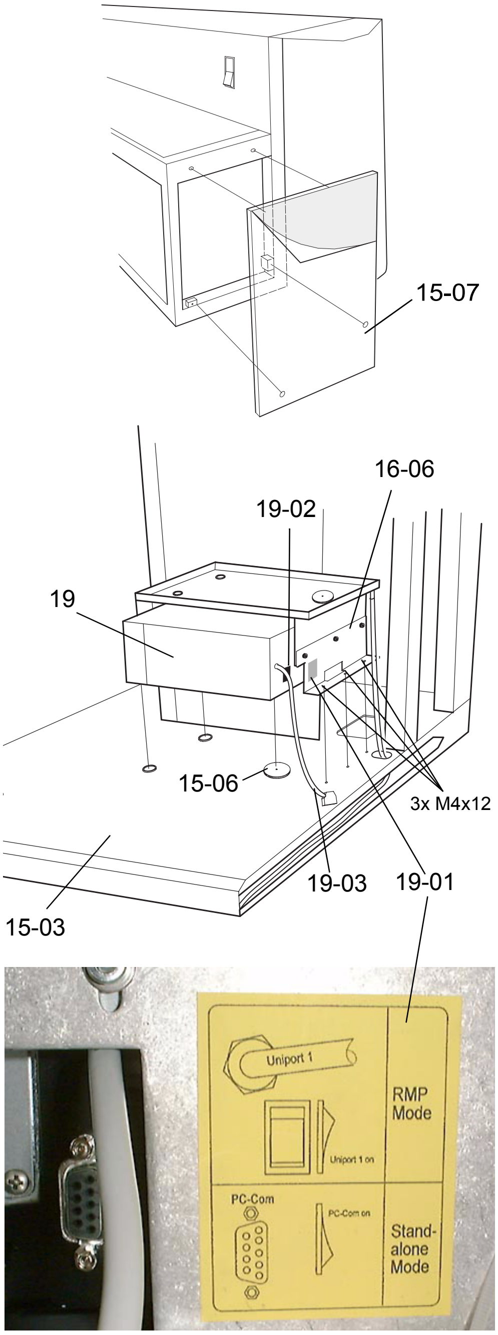
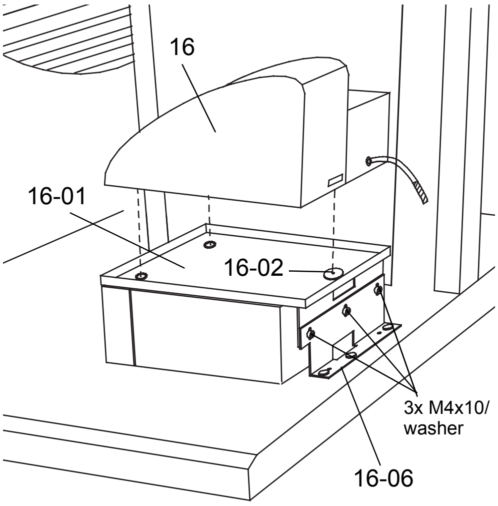


Figure 4-9 Reader assembly

1. Remove the frame cover (15-07) from the add-on module in order to get easier access.
2. For RMP 200 only:
   Lock the adjusting bracket (16-06) in designated place (positioning pins) onto the module worktable (15-03) and fix it with the knurled screws.
3. Place the reader (19) onto the module worktable.
4. Set selection switch (19-02) into correct position, according to the label (19-01) on the adjusting bracket:
   - TOPS V3.0 and earlier: set switch to “RMP mode”.
   - TOPS V4.0 and later: set switch to “Stand-alone mode”.
5. Put a spirit level in X-direction onto the reader housing. If necessary, level horizontally by means of the adjusting wheel (15-06).
6. Connect the reader cable (19-03) to the connection cable on the Uniport (TOPS V3.0 and earlier) or to the second PC-com port (TOPS V4.0 and later).

15-03	Module worktable
15-06	Adjusting wheel
15-07	Frame cover
16-06	Adjusting bracket
19	Reader
19-01	Label
19-02	Selection switch
19-03	Reader cable

Washer (Option)



1 If not yet done: remove the frame cover (Figure 4-9, 15-07) from the add-on module in order to get easier access.

2 For RMP 200 only:
Screw the positioning rack (16-01) to the adjusting bracket (16-06).

3 Place the washer (16) on the positioning rack.

4 Check horizontal alignment with a spirit level. If necessary, adjust by means of the adjusting wheel (16-02).

16	Washer
16-01	Positioning rack
16-02	Adjusting wheel
16-03	Waste tubing positioning rack
16-04	Waste tubing washer
16-05	Washer cable
16-06	Adjusting bracket

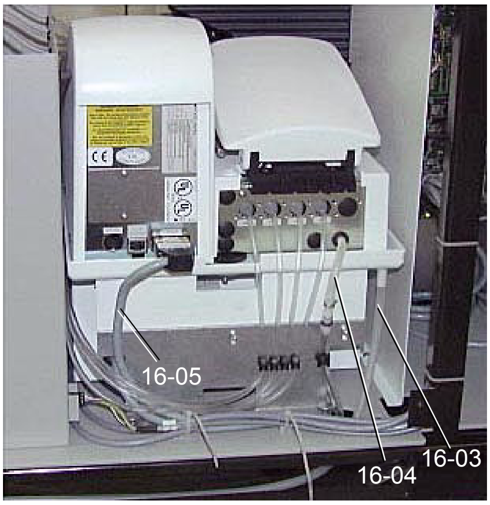


Figure 4-10 Washer assembly

5 Attach the washer cable (16-05) – which is connected to the Uniport – to the washer.

6 Lead the waste tubing (16-03, 16-04) through the module frame.

Heated Incubator (Option)

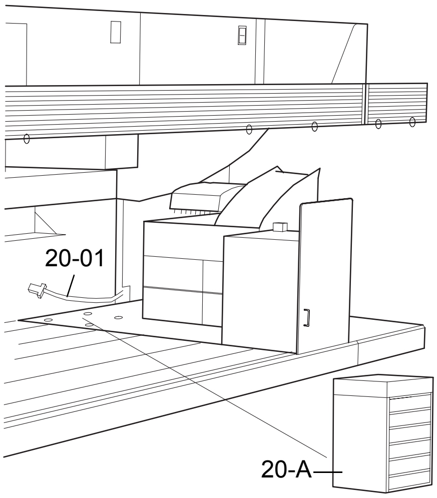


Figure 4-11 Heated incubator 1

Installation of One Heated Incubator

1. Connect the incubator cable (20-01) to the incubator 1 (20-A) and the Optibo.
2. Place the incubator 1 (20-A) into the respective recesses on the module worktable.
3. Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (see 17-05 in Figure 4-13).

20-A	Heated incubator 1
20-01	Incubator cable

Installation of Two Heated Incubators

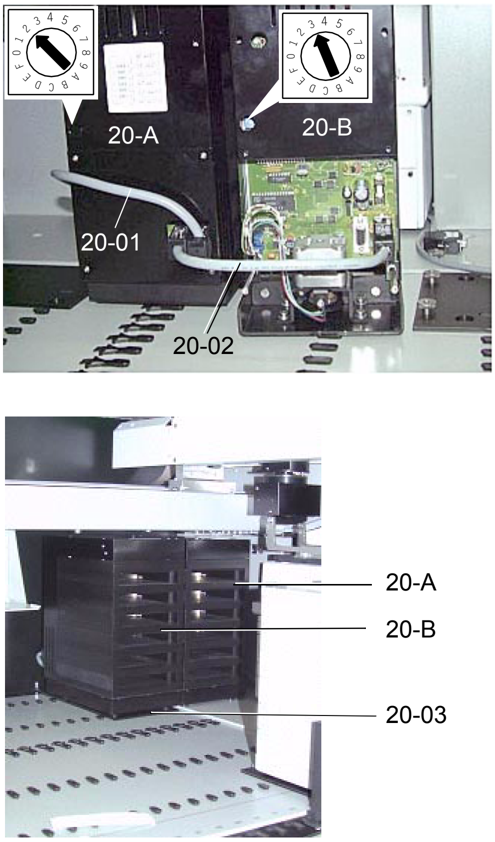


Figure 4-12 Installation of two heated incubators

1. Connect the incubator cable (20-01) to the incubator 1 (20-A) and the Optibo.
2. Join the two incubators with the connection cable (20-02).
3. Change address switch of incubator 2 (20-B) from #2 (= standard setting) to #3.
4. Place the incubator 1 (20-A) into the respective recesses on the module worktable.
5. Insert adapter plate (20-03) beneath incubator 1 onto the worktable.
6. Place the incubator 2 (20-B) into the recesses on the adapter plate.
7. Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (see 17-05 in Figure 4-13).

20-A	Heated incubator 1 (address #2)
20-B	Heated incubator 2, with shaker (address #3)
20-01	Incubator cable
20-02	Connection cable
20-03	Adapter plate

Room Temperature Incubator

Installation of One RT Incubator

1. Fix the mounting bracket (17-01) with the knurled nuts to the module worktable.
2. Place the RT incubator 1 into the recesses on the module worktable and screw it to the mounting bracket.
3. Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (17-05).
4. Attach the incubator cable (17-02) – which is connected to the Supervisor board – to the incubator 1 (17-A).

17-A	Room temperature incubator 1
17-B	Room temperature incubator 2
17-01	Mounting bracket
17-02	Incubator cable RT1
17-03	Incubator cable RT2
17-04	Adapter plate
17-05	Special key

Installation of Two RT Incubators (Option)

1. Place the adapter plate (17-04) onto the worktable.
2. Fix the mounting bracket (17-01) with the knurled nuts to the module worktable and the adapter plate.
3. Place the RT incubator 1 into the recesses on the module worktable and screw it to the mounting bracket.
4. Place the RT incubator 2 into the recesses on the adapter plate and screw it to the mounting bracket.
5. Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (17-05).
6. Attach the incubator cables (17-02, 17-03) – which are connected to the Supervisor board – to the incubators.

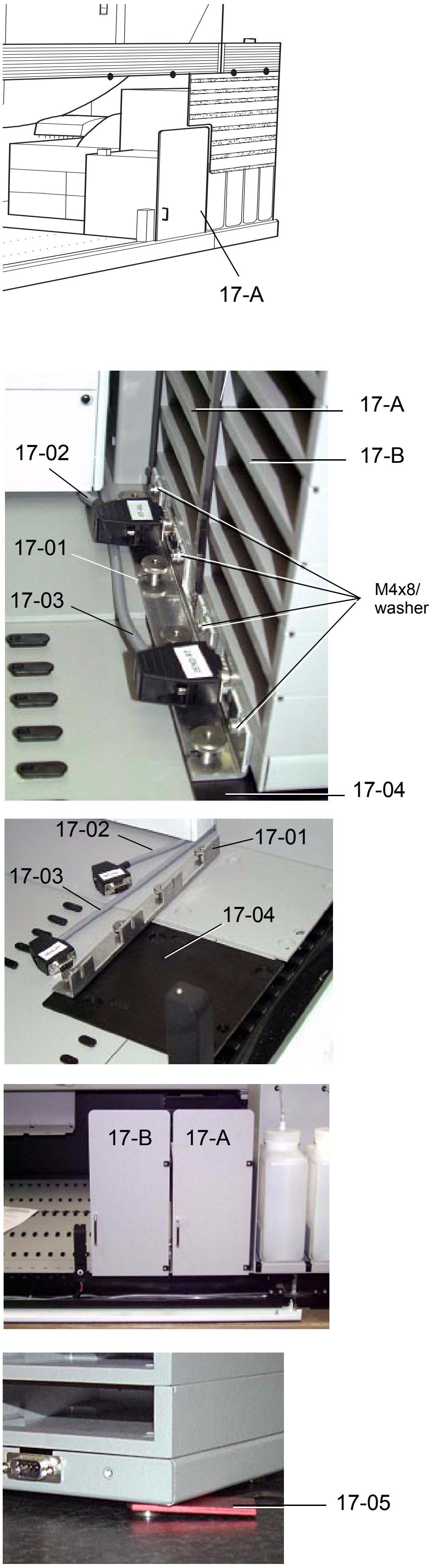


Figure 4-13 Room temperature incubators

Wash Bottle Rack

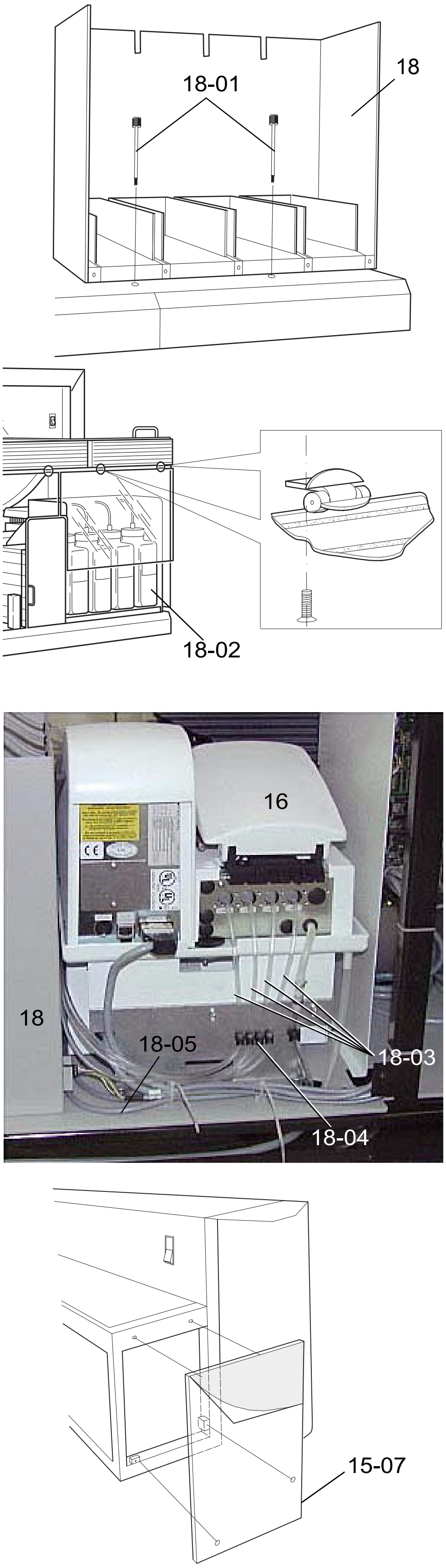


Figure 4-14 Installation of wash bottle rack

Recommendation: As the fixing screws (18-01) might get into contact with spilled wash liquid, grease them to prevent from stucking.

1 For RMP 200 only:
   - Place the wash bottle rack (18) on the module worktable and insert the fixing screws (18-01), but do not tighten yet.
   - Mount the add-on module safety panel.
   - Make sure the wash bottle rack is aligned parallel to the closed safety panel.
   - Tighten the fixing screws (18-01).
   - Place the bottles (18-02) in the wash bottle rack.

16	Washer
18	Wash bottle rack
18-01	Fixing screws
18-02	Bottle
18-03	Wash liquid tubing
18-04	Tubing clip
18-05	Cable

2 Connect the wash liquid tubing (18-03) to the bottles and their respective channels at the washer (16).

   Make sure for each tubing that the number printed on the wash bottle rack corresponds with the one printed on the rear of the washer.

3 Fix the tubing into tubing clip (18-04).

4 Attach the cable (18-05) marked “Niveau” – which is connected to the Supervisor board – to the wash bottle rack.

5 Install the frame cover (15-07) on the add-on module.

LICOS

1 For RMP 200 only:
   - Insert the print cover (15-08) and fix it with the knurled nuts.
   - Place the system liquid container (15-09) in the compartment and connect the system liquid tubing (white connector, leading to FWO) and the LICOS tubing (blue connector, leading to Supervisor board) to the container.
   - Lead the fill tubing into the system liquid container.

2 Connect waste liquid tubing, leading to the Supervisor board, to LICOS sensor rod. Place LICOS sensor rod into the waste container.

15-08	Print cover
15-09	System liquid container

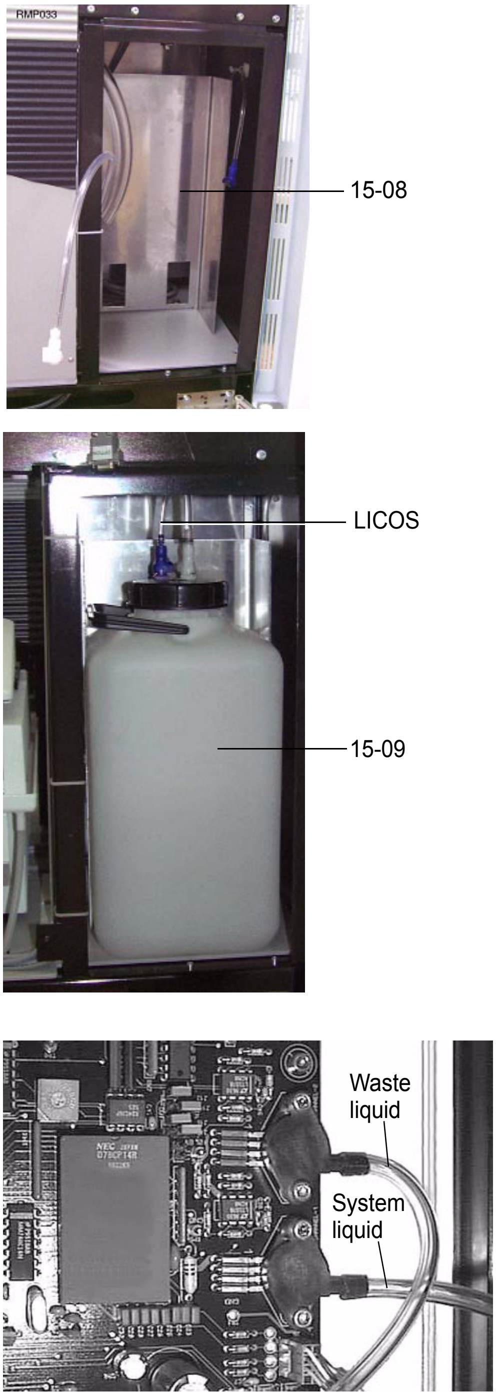
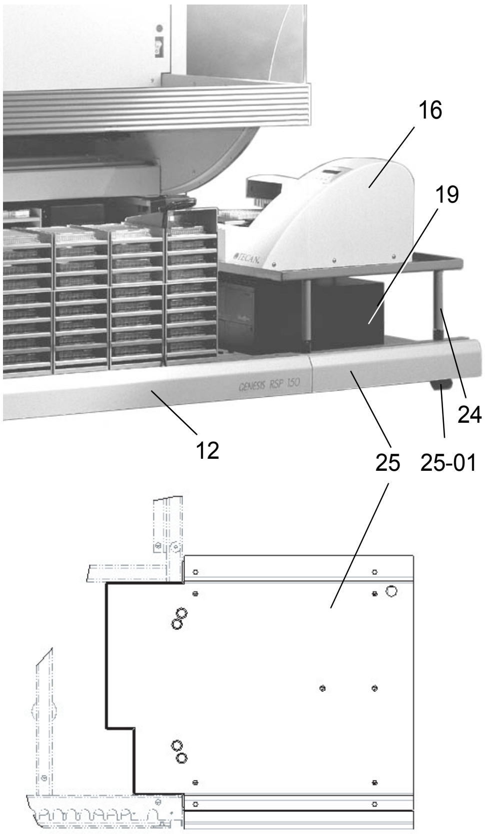


Figure 4-15 Installation of LICOS

Alarm Device Please refer to Installation Instructions for Alarm Device V2, Doc ID 391 255.

4.3.3 RWS Specific Installation Tasks

Workstation Extension (RWS Assay)



The workstation extension is an option for RWS Assay instruments only. It is used as support for reader and washer.

1 Install the workstation extension (25) at the right side of the cut out worktable (12).

2 Check horizontal alignment with a spirit level; if necessary, adjust by means of the two right supports (25-01).

12	Cut out work table
16	Washer
19	Reader
24	Mounting assembly for washer
25	Workstation extension
25-01	Support

Figure 4-16 RWS Assay workstation extension

Variable Extension Deck (RWS Logistics)

The variable extension deck is an option for RWS Logistics instruments only. It is used as support for Ultra reader and further external devices.

The variable extension deck can either be placed on the right or on the left side of the instrument.

Reader (Option)

1 For RWS Assay:

- Place the reader (19) onto the workstation extension (25).

For RWS Logistics:

- Install the positioning plate on the variable extension deck.
- Place the Ultra reader onto the positioning plate.

2 Connect the reader to the power supply and to PC-com port.

Washer (Option)

For RWS Assay only.

1 Install the mounting assembly for washer (24) onto the workstation extension (25).

2 Place the washer (16) on top of the mounting assembly.

3 Check horizontal alignment with a spirit level. If necessary, adjust by means of the mounting assembly legs.

4 Connect the washer to the power supply and to PC-com port.

5 Connect wash liquid tubing and waste tubing to the washer and respective liquid containers.

Heated Incubator (Option)

Installation of One Heated Incubator

1 Install adapter plate onto worktable.

2 Place incubator into respective recesses on the adapter plate.

3 Connect the incubator cable to the Optibo/Optibo Power.

4 Check horizontal alignment with a spirit level. If necessary, adjust by means of the supplied special key (see 17-05 in Figure 4-13).

Installation of Up To Four Heated Incubators

Corresponding to the workstation configuration, up to four incubators can be placed at the rear of the worktable.

1 Install each incubator as described under Installation of One Heated Incubator.
It depends on the application software, if it is also possible to connect maximal two incubators in series.

2 Assure proper address setting for each incubator in compliance with possibly other options (Refer to Section 6.2.2 Jumper and Address Settings Overview).
Standard setting for one incubator is address #2.

4.3.4 Further Options and Modules for RSP/RWS

Connecting Options and Modules

1 Make sure all options and modules are compatible (Refer to Section 3.2 Compatibility Matrix).

2 Assure proper address settings (Refer to Section 6.2.2 Jumper and Address Settings Overview).

3 Prepare all options and modules according to manufacturers instructions and connect them to Optibo/Optibo Power or Uniport or CANDI board.

LICOS

1 Connect LICOS sensor tubing, leading to MPO board, to the LICOS sensor rods.

2 Place LICOS sensor rods into respective containers:

- Tube 1: system liquid container
- Tube 2: waste container

3 Place system liquid container on worktable level to avoid pressure differences within tubing system.

Access Option/ Signal Lamp Please refer to Installation Manual ID 392 330

4.3.5 Computer, Software

1. Place the computer on the left side of the instrument. Install the computer according to manufacturer’s instructions.
2. Make sure the instrument is switched off. Install communication cable between computer (COM 2) and instrument (Optibo or Optibo Power).
3. Install Genesis instrument software and – if necessary – perform firmware download (refer to Genesis Instrument Software Manual Doc ID 390 791).
4. Install respective application software.

4.4 Commissioning

Mechanical Checks

Manually check smooth movement of the LiHa 2 and – if installed – RoMa 2 and PosID 2.
If there is any resistance in the movement, check for dirt residue and clean thoroughly.

Quick Jumper Settings Test

Control CAN-bus resistance to check correct jumper settings (see Section 6.2.3, 'CAN-Bus Resistance Test').

Retightening Screws

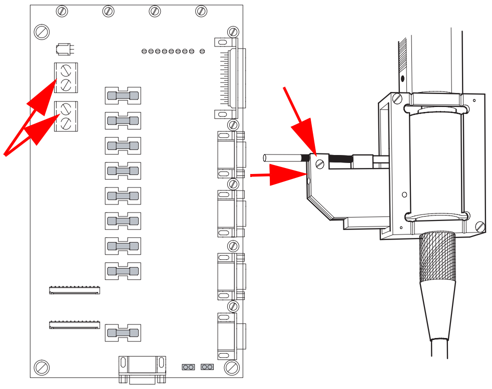


Figure 4-17 Retightening screws

1 Tighten all power cable screws on the Optibo/Optibo Power (left access door).

2 Tighten all ILID plug fixing screws.

Make Liquid System Ready for Use

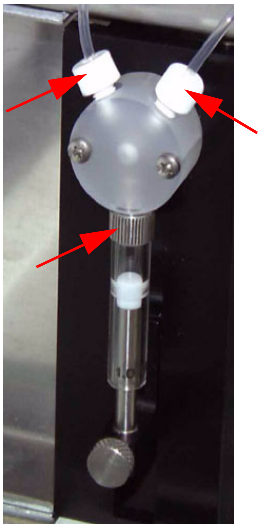


Figure 4-18 Diluter

1 Tighten tubing connections and the syringe screw on diluters.

For these tasks, a better result is achieved when the valves with syringes are removed from the diluters.

2 Tighten tubing connections on distributors (top cover).

3 Mount tips.

4 Open worktable front cover (10), remove sealing strip. Place wash station on the worktable. Cut the sealing strip at the appropriate length and reinsert.

Power-on

1 Connect the instrument to the mains.

2 Set mains power switch to on.

Check Readiness for Operation

1. According to the document Installation Qualification, Doc ID 391 180, perform Setup & Service software module.
2. Perform calibration process according to document Operation Qualification, Doc ID 391 182.

Cleaning

Check the whole system for dirt residue resulting from transport and installation. Observe appropriate sections in the Operating Manual.

4.5 Conformity Assessment and CE Marking for RWS

Legal Situation

Genesis RWS is an open and flexible platform providing our clients with many configuration possibilities. A Genesis RWS instrument is considered as sub-assembly that must be integrated into a complete system. Each system has to be assessed and investigated to comply with particular local requirements.

The openness of the Genesis RWS system makes it impossible to declare it as CE conform and affix the corresponding label.

Responsibility

A system integrator is a legal person (e.g. a RO within Tecan group or a distributor) who acts in legal sense between Tecan Schweiz AG (manufacturer of sub-assembly) and the end-user of the system. The system integrator takes the responsibility of a re-manufacturer for the whole system and must fulfill the following points:

1. Description of complete system (product)
2. Draw up (technical file)
3. Assure conformity to local regulations
4. Declare Conformity
5. Affix CE-marking (within EU-region only)

Tecan Schweiz AG can provide support to help system integrators with points 2, 3, 4 and 5 above.

Safety Standards

Please note that Genesis RWS Instruments meet the following:

- Safety requirements for laboratory equipment
  EN 61010-1 / UL 3101-1 / CSA C22.2 No 1010-1
  except Part 5 and 7, which are met only in part due to the open nature of the instrument
- EMC requirements for laboratory equipment
  EN 50081-1, part 1
  EN 50082-1, part 1

The above is stated in the manufacturer’s declaration.

4.6 Site Acceptance

Completion

1. In case of a RWS instrument: make a conformity declaration.
2. Fill out the Acceptance Protocol (Doc ID 391 825) and have it signed by the customer.

5 Maintenance

Purpose of This Chapter

This chapter summarizes the preventive maintenance activities intended to retain the Genesis RSP, RMP or RWS instrument in a state in which it maintains the required or specified performance.

5.1 Concerning Your Safety

Decontamination

Depending on the application, the instrument may be contaminated with compounds hazardous to your health.

WARNING

The instrument may be contaminated. Before performing any maintenance or repair tasks:

- Make sure that the instrument has been decontaminated by an expert according to standard laboratory regulations.
- Request a filled out and signed Decontamination Declaration (Doc ID 390 901)

Unless otherwise noted, always switch off power and disconnect from mains before carrying out any maintenance tasks.

5.2 Consumables

Cleaning Agents

ATTENTION

Strong detergents may dissolve carrier and worktable surface coatings.
Use only cleaning agents that are recommended by Tecan and according to table Cleaning in Section 5.3.2.

Alcohol

Use ethyl-alcohol or 2-Propanol (Isopropanol).

Water

Use distilled or de-ionized water.

Bleach

Use sodium hypochlorite solution, max. 6 %.

Detergent

Use a weak detergent like

- RoboScrub®, order through Tecan US (order number 70-736 for 16 oz. bottle) or

- CLEAN SYSTEM, order through Tecan-D:
  Daily System Clear = to clean the system daily = order number 30000938 (250 ml),
  Setup Clean = to clean contaminated systems = order number, 30000937 (500 ml),
  Protolyse = to clean the system from proteins = order number 30000939 (1000 ml),
  Carrystop = against carryover = order number 30000940 (1000 ml).

Cleaning Material Use lint-free tissue only.

5.3 Maintenance Schedule

Spare Parts *For spare parts list with part numbers refer to Chapter 7, 'Check Lists Spare Parts'.*

- Use original Tecan spare parts only.

Note

Spare parts must correspond to the technical requirements laid down by the manufacturer.

5.3.1 Daily/Weekly Maintenance

For daily and weekly maintenance please follow the descriptions in the document Daily/ Weekly Maintenance Checklist, Doc ID 391 193. Check off the appropriate boxes as you go through the maintenance tasks.

5.3.2 Half-Yearly Maintenance

Refer to document Preventive Maintenance Checklist, Doc ID 391 181 and check off the appropriate boxes as you go through the maintenance tasks.

General

Task
Print out system information
Run counter read out

Parts to Be Replaced

Part	Interval: 6 month or …	Refer to …
ILID cables	after 250,000 Z-moves	Section 6.6.4
DiTi cone and tubing extension	after 250,000 Z-moves	
Washer tubing		

Adjustment

Part	Interval: 6 month or …	Refer to …
RoMa 1 Z-brake		Section 6.7.12

Cleaning

Clean every 6 month or when necessary:

Instrument part	Cleaning agent/material
Liquid system, waste system	Water, alcohol, weak detergent
Worktable	Alcohol, weak detergent, bleach 6 %
Metal parts	Alcohol
Arm guide rail, guide rollers of LiHa, RoMa	Alcohol
Z-rods RoMa	Lint-free tissue (do not use any agent)
Z-rods LiHa	Lint-free tissue (do not use any agent)
Carriers	Alcohol, weak detergent, bleach 6 %
Racks	Alcohol, weak detergent, bleach 6 %
Tips	Alcohol, bleach 6 %
DiTi cones	Alcohol
PosID scanner head laser beam output window	Alcohol
Washer manifold	Supplied cleaning needles, water or Ultrasonic bath, water
Reader optic (filter)	Optical cleaning solution (lens tissue recommended)

Test to Be Performed

Perform every 6 month:

Test
Reference position LiHa
Reference position RoMa (for RSP and RWS only)
Check tip adapter function

Fill/flush system
Disposable tips
Liquid detection test
LICOS test
PosID test
Washer: prime each washer channel
Reader: QC test
Door lock test

5.3.3 Yearly Maintenance

Refer to document Preventive Maintenance Checklist, Doc ID 391 181 and check off the appropriate boxes as you go through the maintenance tasks.

General

Perform the half-yearly maintenance tasks as listed in Section 5.3.2.

Parts to be Replaced

Part	Interval: 12 month or …	Refer to …
Syringes	after 1 million moves	Section 6.4.3
3-way valve of diluter	after 1 million moves	Section 6.4.3
Tips		
Aspirating tubing		Section 6.4.2
Interconnecting tubing		Section 6.4.2
Pipetting tubing		Section 6.4.2
Waste tubing		Section 6.4.2

Test to Be Performed

Perform every 12 month:

Test
Precision test

6 Replacement of Spare Parts, Repair

Purpose of This Chapter

This chapter describes the activities carried out after a failure has occurred, intended to restore an item to a state in which it can perform its required function.

Chapter Overview

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6.1 General Notes on Repair

Useful References

- Refer to Chapter 8, 'Instruments at a Glance' for an overview concerning the location of the most common parts.
- For spare parts list with part numbers refer to Chapter 7, 'Check Lists Spare Parts'.
- As Chapter 7 is structured in the sequence of disassembly of an item, it can also be used by experienced FSEs as brief instructions.
- For electrical diagrams refer to Chapter 9, 'Diagrams'.

Spare Parts

- Use original Tecan spare parts only.

Note

Spare parts must correspond to the technical requirements laid down by the manufacturer.

Disposal of Waste

- Dispose used items and consumables according to the relevant national environmental, health and safety laws and regulations.

6.1.1 Concerning Your Safety

Chemical, Biological and Radioactive Hazards

Depending on the applications, parts of the instrument may have been in contact with biohazardous, poisonous or even radioactive materials. A potential risk may arise from the liquids that have been handled on the instrument.

- Strictly apply appropriate safety precautions according to general laboratory and applicable local, state and federal regulations.

WARNING

Potential Biohazard. The instrument might be contaminated! For servicing, use appropriate personal protective equipment!

Decontamination

For your own and any other affected person's safety, make sure the instrument or parts have been thoroughly decontaminated prior to carrying out any maintenance and repair task on the instrument or before sending it or parts of it for repair:

- Thoroughly clean and decontaminate all relevant parts.
- Provide a filled-out and signed Decontamination Declaration (Doc ID 390 901).

Electrical Shock Hazard

WARNING

Unless otherwise noted, always switch off power and disconnect from mains before carrying out any tasks described in this chapter.

Electrostatic Sensitive Devices

Discharge static electricity from your body by wearing a wrist strap to protect yourself and sensitive control electronics installed:

- Wear a wrist strap during all installation and maintenance tasks, e.g. when exchanging components.

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.

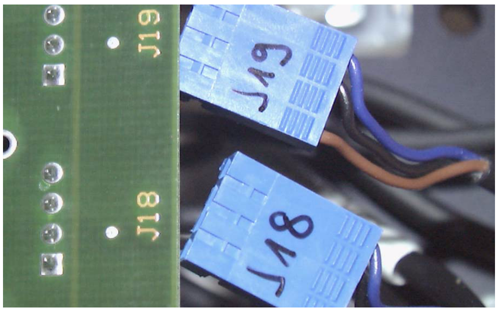
6.1.2 General Repair Tasks

Loctite® 638

- Several set screws are glued with Loctite 638. Use a hot-air apparatus to soften the adhesive before unscrewing these screws.

Disconnecting Cables

- When disconnecting cables, always mark designation (Jxx) on connector using a water resistant pen.



If due to insufficient space, designations are not marked on the PCB use electrical diagrams instead.

Figure 6-1 Connector designation

When replacing any PCB …

- Make sure the jumpers for CAN-bus resistance are set identically to the replaced PCB (see also Section 6.2.2, ‘Jumper and Address Settings Overview’).
- Control if address switch is set correctly (see Section 6.2.2, ‘Jumper and Address Settings Overview’).
- Check CAN-bus resistance (see Section 6.2.3, ‘CAN-Bus Resistance Test’).

Cleaning

- Wipe off grease residue and thoroughly clean affected instrument parts after any repair task.

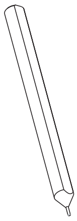
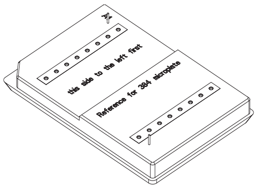
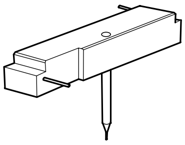
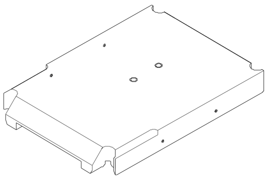
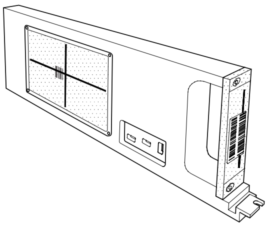
6.1.3 Operating Tests after Repair

Service Checklist

- After replacing or removing and reinstalling modules or spare parts, carry out the appropriate tests according to Service Checklist Doc ID 391 183 (included in the Genesis Maintenance and Service Logbook).

6.2 Abstract of Important Data

6.2.1 Special Tools

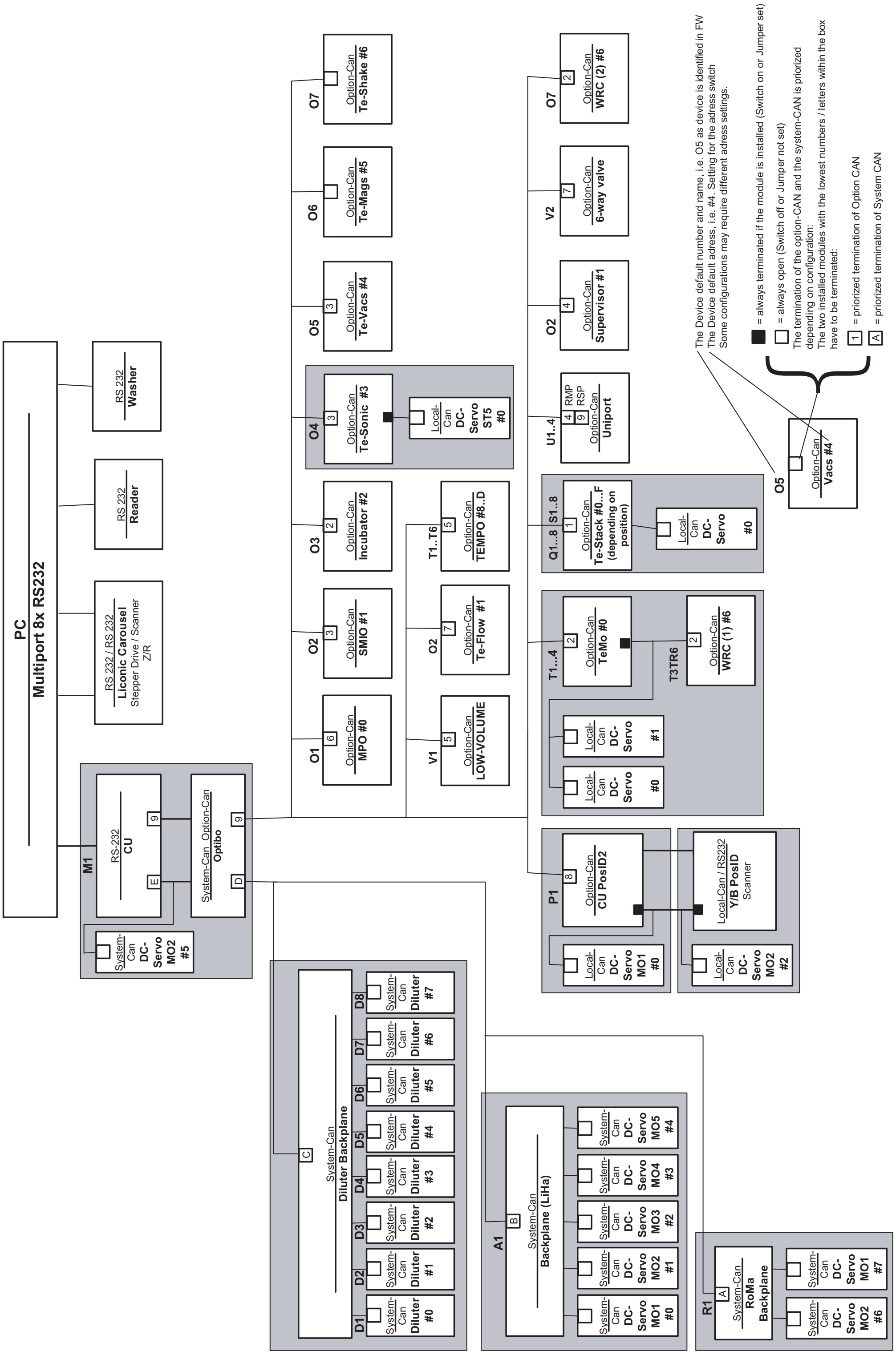
LiHa reference tip	Part No. 612 503	
384 well tip adjustment tool	Part No. 613 103	 this side to the left first Reference for 384 microplate
RoMa calibration tool	Part No. 612 622	
RoMa teach plate	Part No. 613 101	
PosID service rack	Part No. 613 100	

6.2.2 Jumper and Address Settings Overview

The following communication overview shows …

- the default address settings on the electronic boards of the different modules,
- on which modules the jumpers have to be set/switched on, or removed/switched off according to the configuration of the instrument:

Communication Overview


PC
Multiport 8x RS232
RS 232 Washer
RS 232 Reader
RS 232 / RS 232 Liconic Carousel Stepper Drive / Scanner Z/R
M1
RS-232 CU
9
E
System-Can Option-Can Optibo
9
D
System-Can DC-Servo MO2 #5
O1
6
Option-Can MPO #0
O2
3
Option-Can SMIO #1
O3
2
Option-Can Incubator #2
O4
3
Option-Can Te-Sonic #3
Local-Can DC-Servo ST5 #0
O5
3
Option-Can Te-Vacs #4
O6
Option-Can Te-Mags #5
O7
Option-Can Te-Shake #6
V1
5
Option-Can LOW-VOLUME
O2
7
Option-Can Te-Flow #1
T1..T6
5
Option-Can TEMPO #8..D
P1
8
Option-Can CU PosID2
Local-Can DC-Servo MO1 #0
Local-Can / RS232 Y/B PosID Scanner
Local-Can DC-Servo MO2 #2
T1...4
2
Option-Can TeMo #0
T3TR6
2
Option-Can WRC (1) #6
Local-Can DC-Servo #1
Local-Can DC-Servo #0
Q1...8 S1..8
1
Option-Can Te-Stack #0...F (depending on position)
Local-Can DC-Servo #0
U1...4
4 RMP
9 RSP
Option-Can Uniport
O2
4
Option-Can Supervisor #1
V2
7
Option-Can 6-way valve
O7
2
Option-Can WRC (2) #6
O5
Option-Can Vacs #4
The Device default number and name, i.e. O5 as device is identified in FW
The Device default adress, i.e. #4. Setting for the adress switch
Some configurations may require different adress settings.
■ = always terminated if the module is installed (Switch on or Jumper set)
☐ = always open (Switch off or Jumper not set)
The termination of the option-CAN and the system-CAN is priorized depending on configuration:
The two installed modules with the lowest numbers / letters within the box have to be terminated:
1 = priorized termination of Option CAN
A = priorized termination of System CAN
C
System-Can Diluter Backplane
D1 System-Can Diluter #0
D2 System-Can Diluter #1
D3 System-Can Diluter #2
D4 System-Can Diluter #3
D5 System-Can Diluter #4
D6 System-Can Diluter #5
D7 System-Can Diluter #6
D8 System-Can Diluter #7
A1
B
System-Can Backplane (LiHa)
System-Can DC-Servo MO1 #0
System-Can DC-Servo MO2 #1
System-Can DC-Servo MO3 #2
System-Can DC-Servo MO4 #3
System-Can DC-Servo MO5 #4
R1
A
System-Can RoMa Backplane
System-Can DC-Servo MO2 #6
System-Can DC-Servo MO1 #7

Jumper Allocation

PCP	**System CAN-bus**	**Option CAN-bus**	**Local CAN-bus**
Optibo, Optibo Power	J12	J13	—
CU board	J1	J22	
MPO board V2.0 MPO board V3.1/V4.0	— —	J4 J2	— —
LiHa backplane	J14	—	—
Dilback	J10	—	—
RoMa 1 backplane RoMa 2 backplane	J2 J1	— —	— —
PosID 1/PosID 2 CU board	—	J8	J6

6.2.3 CAN-Bus Resistance Test

Purpose of this test is to verify whether bus end jumper settings on control electronics are correct.

Will Be Applicable

- When commissioning a new instrument.
- After exchange or new installation of a LiHa 1/LiHa 2, RoMa 1/RoMa 2, PosID 1/ PosID 2 or other options as e.g. Te-VacS etc.
- After exchange or supplemental installation of PCBs.

Required Special Tools

- Multimeter

Test Procedure

1 Switch off the instrument.

2 On the Optibo or Optibo Power (left access door) check the CAN-bus resistance between the respective check points:

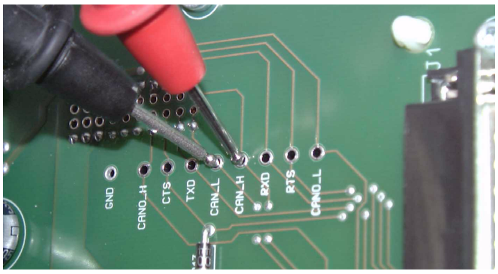


Figure 6-2 Check points for System CAN-bus

- System CAN
  Measure resistance between CAN_L and CAN_H.

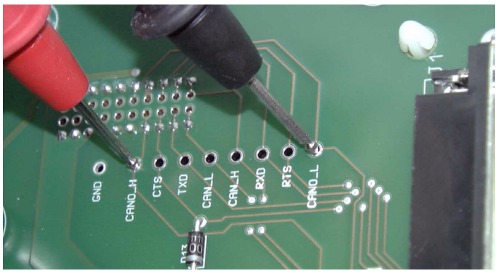


Figure 6-3 Check points for Option CAN-bus

- Option CAN
  Measure resistance between CANO_L and CANO_H.

3 Correct CAN-bus resistance:

50–65 Ω:	correct number of jumpers
< 50 Ω:	too many jumpers are set
~ 40 Ω:	1 jumper too much
> 65 Ω:	too few jumpers are set
~ 120 Ω:	1 jumper too few

If CAN-bus resistance is not between 50 an 65 Ω: compare jumper settings and CAN-bus connections with 'Communication Overview' in Section 6.2.2, 'Jumper and Address Settings Overview' and correct.

6.2.4 Software Error Messages

Toolbox General Errors

Toolbox error code	Explanation
0	OK (no error)
1	Toolbox not initialized (from V2.1 on: not opened)
2	Toolbox already initialized (from V2.1 on: already open)
3	Toolbox init error (from V2.1 on: error in opening)
4	Communication driver error
5	Incorrect answer string format (cannot extract)
6	Illegal command parameter value
7	Error list contains at least one error
8	No such worktable
9	Open rack database failed
10	Worktable access error (carrier/rack)
11	Evaluation access (not a single position defined)
12	Evaluation access (not a single position is accessible due to Y)
13	Evaluation access (position out of range)
14	Accessing all selected positions not possible
15	No carrier/rack defined
16	Worktable access error (tube)
17	Open comm log file failed
18	No carrier on specified grid position
19	Worktable object creation error
20	Open communication driver failed
21	Close communication driver failed
22	Evaluation access (not a single position is accessible due to X)
23	Genesis DB not open
24	Communication driver not open
25	Plate stuck on gripper
26	Balance initialization error
27	Balance isn't initialized
28	Balance isn't correct tared
29	Measurements not enough linear. Preparing/weighing not possible.
30	Wrong machine type. No balances available.
31	Balance not prepared. Weighing not possible.
32	Error while getting a balance value. Weighing not possible.

Toolbox error code	Explanation
33	Wrong machine type. No low volume support.
34	This machine has no pinch valves
35	No installable easy option available
36	Easy option slot occupied
37	Defined Easy Option module not available
38	The initialization of the serial communication port failed
39	Sending through the serial communication port failed
40	Receiving through the serial communication port failed
41	Command not implemented (for the PosID 1)
42	Command not implemented (for the PosID 2)
43	Difference too big between “prepare weigh” and “weigh” in evaporation
44	Worktable View: nothing selected
45	Worktable View: index out of range
46	Worktable View: …
47	Worktable View: object not created

Toolbox User Interactions

Toolbox error code	Explanation
90	Abort from user
91	Retry from user
92	User (calling application) handles error
93	Ignore from user
94	“Go to ZBottom” from user

Toolbox Data Errors

Toolbox error code	Explanation
101	Incorrect tip number
102	Data pointer is NULL
103	Individual tip data set (no global data available)
104	Incorrect liquid index
105	Data set not defined
106	Selector out of bounds
107	Not enough space (for complete report)

Toolbox error code	Explanation
108	Invalid diluter number
109	Parameter value(s) out of range
110	Invalid arm ID
111	Invalid number of tips
112	Invalid number of diluters

Toolbox Communication Errors

Toolbox error code	Explanation
201	COM unknown error
202	COM device still busy
203	COM device time-out

Toolbox Device Errors (Ranges)

Toolbox error code range	Device Address	Explanation
300		Common
400	M	CU
500	A	LiHa
527	A	LiHa (tip mounted)
600	O	MPO, Incubator, Supervisor
700	D	Diluter
800	P	PosID
900	R	RoMa
1000	V	Low Volume Option
1100	U	Uniport
10,000	P	PosID extended errors

Common Errors for All Devices

Toolbox error code = Toolbox error code range + Communication driver error code

Examples:

Toolbox error code 807 = 800 + 7 = PosID not initialized
Toolbox error code 528 = 527 + 1 = LiHa (tip mounted) initialization error

Communication driver error code	Explanation
1	Initialization error

Communication driver error code	Explanation
2	Invalid command
3	Invalid operand
4	Invalid command sequence
5	Device not implemented
6	Time-out error
7	Device not initialized
8	Command overflow of CU
15	Command overflow of subdevice

CU Error Codes

Toolbox error code = Toolbox error code range (= 400 for CU) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
13	413	No access to serial EEPROM
16	416	Power fail circuit error
17	417	Arm collision avoided between LiHa and RoMa
18	418	Door lock 1 failed
19	419	Door lock 2 failed
20	420	No new device #V node detected
21	421	Device #V node already defined

LiHa Error Codes

Toolbox error code = Toolbox error code range + Communication driver error code
First number = LiHa (range 500), second number = LiHa tip mounted (range 527)

Communication driver error code	Toolbox error code	Explanation
9	509/536	No liquid detected (MDT, MET)
10	510/537	Drive no load
11	511/538	Not enough liquid (MDT)
12	512/539	Not enough liquid (MET)
13	513/540	Arm collision avoided with PosID
16	516/543	Power fail circuit error
17	517/544	Arm collision avoided with RoMa
18	518/545	Clot limit passed (MCT)

Communication driver error code	Toolbox error code	Explanation
19	519/546	No clot exit detected (MCT)
20	520/547	No liquid exit detected (MDT, MET)
23	523/550	Not yet moved (MDT, MET)
24	524/551	ILID pulse error (MDT, MET, MCT)
25	525/552	Tip not fetched (AGT, ADT)
26	526/553	Tip not mounted (AGT, ADT)
27	527/554	Tip mounted (AGT, ADT)

RoMa Error Codes

Toolbox error code = Toolbox error code range (= 900 for RoMa) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
9	909	Plate not fetched (AGR)
10	910	Drive no load
16	916	Power fail circuit error
17	917	Arm collision avoided with LiHa

XP Error Codes

Toolbox error code = Toolbox error code range (= 700 for Diluter) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
9	709	Plunger overload
10	710	Valve overload
11	711	Valve in bypass
13	713	No access to EEPROM

PosID 1 Common Errors

Toolbox error code = Toolbox error code range + Communication driver error code*

**= 800 for Communication driver error codes up to 31 and 10,000 for Communication driver error codes beyond 31*

Communication driver error code	Toolbox error code	Explanation
14	814	Extended error in device occurred (REE reports the extended error code)
36	10,036	EEPROM failure

Communication driver error code	Toolbox error code	Explanation
37	10,037	EEPROM no access (hardware problem; e.g. no chip available)
38	10,038	EEPROM data invalid (e.g. chip empty or invalid data, system adjustment required!)
39	10,039	EEPROM special error (trap for rare error; data is valid!)
40	10,040	Invalid mnemonics
41	10,041	Invalid argument (parameter out-of-range)
42	10,042	Invalid parameter number
43	10,043	Invalid device address
44	10,044	Invalid frame type
45	10,045	Invalid message length

PosID 1 Axis Errors (Ranges)

Communication driver error code ranges	Explanation
100	X-axis offset (arm movement)
200	Y-axis offset (grip movement)
300	B-axis offset (barcode scanner movement)

PosID 1 Common Axis Errors

Communication driver error code:
x = communication driver error code range

Examples:

Communication driver error code 263 = 200 + 63 = Y-axis target not reached

Communication driver error code 1324 = 300 + 1024 = B-axis overload detected

Toolbox error code = Toolbox error code range (10,000 for PosID) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
x50	10,x50	Unknown axis mnemonic
x51	10,x51	Invalid axis identifier
x52	10,x52	# of sub-axis is out of limit
x55	10,x55	Collision detection is active
x58	10,x58	Time-out calculation error

Communication driver error code	Toolbox error code	Explanation
x59	10,x59	Dynamic read calculation error
x61	10,x61	Initialization: target not reachable
x62	10,x62	Target out-of-range
x63	10,x63	Target not reached
x65	10,x65	Axis movement time-out
1x20	11,x20	CAN over run
1x21	11,x21	No load
1x22	11,x22	No liquid detected
1x23	11,x23	Break point not reached
1x24	11,x24	Overload detected
1x25	11,x25	Delayed action pending (ready to execute)
1x26	11,x26	Delayed action pending (ready to execute)
1x27	11,x27	Command not yet implemented
1x29	11,x29	DC-Servo multiple error

PosID 1 Miscellaneous Errors

Toolbox error code = Toolbox error code range (10,000 for PosID) + Communication driver error code

BCS = Barcode Scanner; HOST = PosID CU

Communication driver error code	Toolbox error code	Explanation
401	10,401	BCS initialization: no ID REQUEST from BCS after ATTENTION from HOST
405	10,405	Unexpected response from BCS after START DECODE
411	10,411	No decoded barcode from BCS
412	10,412	Barcode string length out-of-range
413	10,413	NR (No Read) message from BCS
421	10,421	CMNDNAK (CoMmaND Not Acknowledge) respond from BCS
422	10,422	No ACK or NAK respond from BCS
425	10,425	No respond from BCS
426	10,426	Checksum error detected by BCS
427	10,427	Unexpected respond from BCS
435	10,435	No respond from BCS

Communication driver error code	Toolbox error code	Explanation
436	10,436	Checksum error detected by HOST
437	10,437	Unexpected respond from BCS
438	10,438	No complete respond from BCS
441	10,441	HOST received message from wrong message source
451	10,451	BC type out-of-range
452	10,452	Verify mode out-of-range
455	10,455	Unexpected character in BC string
456	10,456	BC check digit error
460	10,460	Invalid test number
470	10,470	Parameter out-of-range
501	10,501	Invalid field id
502	10,502	Invalid parameter
510	10,510	Invalid sector id
511	10,511	Sector already active
512	10,512	Sector not yet active
513	10,513	Sector parameter out-of-range
514	10,514	Sector limit reached
520	10,520	Invalid fixed field id
521	10,521	Fixed field already active
522	10,522	Fixed field not yet active
523	10,523	Fixed field parameter out-of-range
530	10,530	Unknown carrier state
531	10,531	Invalid carrier code
532	10,532	Invalid carrier code string length
533	10,533	Invalid carrier code type
534	10,534	Invalid carrier placement
535	10,535	Invalid carrier id
536	10,536	Carrier id already active
537	10,537	Carrier id not yet active
538	10,538	Invalid carrier code format
545	10,545	Invalid carrier type
546	10,546	Carrier type already active
547	10,547	Carrier type not yet active
548	10,548	Invalid carrier data id
549	10,549	Carrier is at remove position

Communication driver error code	Toolbox error code	Explanation
550	10,550	Unknown rack/sample state
555	10,555	Invalid rack/sample type
556	10,556	Rack/sample type already active
557	10,557	Rack/sample type not yet active
558	10,558	Invalid rack/sample data id
560	10,560	Move right carrier locked
601	10,601	Invalid port number
602	10,602	Invalid bit number
701	10,701	BC scan task not started
710	10,710	No carrier present
711	10,711	Expected carrier not found
720	10,720	Calibration Y max read
741	10,741	Reload of same carrier
742	10,742	Comparison of 1st rack/sample impossible
743	10,743	Illegal removal of carrier detected
744	10,744	Illegal movement of carrier detected
750	10,750	Previous BC read was equal

PosID 2 Errors

Toolbox error code = Toolbox error code range (= 800 for PosID) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
9	809	No liquid detected by DC-Servo (error code currently not used)
10	810	Drive with no load detected
11	811	Break point reached
12	812	No access to parameter block
13	813	Collision between LiHa and PosID avoided
14	814	Extended error
16	816	Power fail circuit failure
17	817	Not locked to grid
18	818	Sector not defined
20	820	Barcode scanner failure (communication problem, e.g. wrong answer to ESC sequence)

Communication driver error code	Toolbox error code	Explanation
21	821	Barcode scanner communication error (transmission errors upon OV, FE, PT, VRC cmds)
22	822	Carrier not movable
23	823	Break point not reached
24	824	Carrier not defined
25	825	Rack/sample not defined
26	826	Carrier not loaded (error code currently not used)
27	827	Invalid carrier id barcode
28	828	Carrier not present
29	829	Illegal BCS movement
30	830	BCS failed during initialization (error code currently not used)

Low Volume Option Errors

Toolbox error code = Toolbox error code range (= 1000 for Low Volume Option) + Communication driver error code

Communication driver error code	Toolbox error code	Explanation
9	1009	Selected valve not installed
10	1010	Endless mode not possible
11	1011	Wrong node defined

Incubator Errors

Toolbox error code = Toolbox error code range (= 600 for incubator) + Communication driver error code

Communication driver error coder	Toolbox error code	Explanation
9	609	Shaker not installed
10	610	Shaker position initialization error
11	611	Close door solenoid short or open circuit
12	612	EEPROM checksum error
13	613	EEPROM access error
16	616	Slot temperature overrun
17	617	Temperature sensor short- or open circuit, or suspect
18	618	Shaker fail

Supervisor Errors

Toolbox error = Toolbox error range (= 600 for Supervisor) + Communication driver error

Communication driver error coder	Toolbox error code	Explanation
12	612	LICOS not calibrated
13	613	EEPROM access error
16	616	Door already open
17	617	Hall sensors not calibrated

Uniport Errors

Spectra/Sunrise Errors

Toolbox error = Toolbox error range (= 1100 for Uniport) + Communication driver error

Communication driver error coder	Toolbox error code	Explanation
16	1116	Lamp low
17	1117	Lamp high
18	1118	Transport error
19	1119	Filter error
20	1120	Checksum error
21	1121	No data uploaded by “D” or “D2” cmd.

6.3 Instrument – Disassembly and Assembly Procedures

This section describes mechanical and electronic exchange routines on instrument level.

6.3.1 Worktable

Spare Parts Worktable

For spare parts list with part numbers refer to Section 7.1.1, 'Spare Parts Worktable'.

Following items can be replaced as spare parts:

- Worktable
- Positioning pins
- Sealing strip

Required Special Tool

- Reference tip for LiHa

Removal of Worktable

Will Be Applicable …

- If a new or another type of worktable has to be installed.
- If you need to access the PosID/PosID 2 or an older version of PosID/PosID 2 CU board (located underneath the worktable).

Removal

For more information refer to Section 4.3, 'Installation', inverse order of installation instructions.

1 Empty the worktable completely.

2 For RMP: detach the module worktable.

3 Open the front worktable cover (10).

   - For RMP: remove the door locks (21).
   - For RWS: remove magnet holders.

4 Remove all screw caps (tip: use a watch maker screwdriver) and all fixing screws from the worktable.

5 Remove the worktable by carefully lifting and pulling forward.

Installation of Worktable

1 Carefully install the worktable.

2 RSP and RWS: insert the 4 countersunk screws on the rear right and rear left but do not tighten them yet.

RMP: insert the 2 countersunk screw on the rear left but do not tighten them yet.

3 Insert but only *slightly* tighten the oval head screws.

4 Manually align the worktable, then tighten the front left screw.

This screw will act as a pivot point during the following alignment.

5 Install the reference tip onto the LiHa:

- 4-Tip LiHa: mount reference tip on position 1 (first tip from behind).
- 8-Tip LiHa: mount reference tip on position 3 (third tip from behind).

6 Manually position the reference tip at the edge of the foremost positioning pin in grid position 1 (most left grid). Check the gap between pin and reference tip.

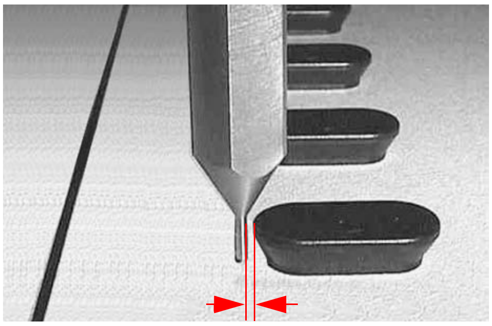


Figure 6-4 Gap between reference tip and positioning pin

7 Manually move the LiHa to the rightmost grid position and check the gap between pin and reference tip.

The gap must be the same on either side of the worktable.

8 When the worktable is positioned: tighten the fixing screws and insert the screw caps.

9 Reinstall all previously removed parts. For detailed information about installing …

- RMP door locks: refer to Section 6.3.2.
- RMP 200 add-on module: refer to Section 4.3, ‘Installation’.
- Reader, washer and incubators: refer to Section 4.3, ‘Installation’.

10 Ensure Operating Readiness as described later in this section.

Ensure Operating Readiness

For detailed information refer to the Genesis Instrument Software Manual.

After replacing or reinstalling the worktable or replacing the positioning pins, control – and if necessary carry out – following settings:

Step	Test or Setup
1	LiHa • Check reference positions • Adjust scale factors *Only necessary if check failed* • Adjust reference positions *Only necessary if check failed* • Set absolute Z • Set individual Z

2	PosID • Test • PosID adjustment *Only necessary if test failed*
3	RoMa • Check reference positions • RoMa setup *Only necessary if check failed*

6.3.2 Door Locks

RMP

For the description of disassembly and assembly procedure for the Genesis RMP door locks, please refer to the document Doc ID 391 260.

RSP, RWS

The door lock is part of the access option for RSP and RWS instruments. Please refer to document Doc ID 392 330 for further information.

6.3.3 X-Drive Assembly

The X-drive assembly is installed in the X-bay (5) of the instrument. It consists of one X-motor and a X-belt which drives the LiHa. If the instrument is equipped with a RoMa, a second X-drive assembly is installed which drives the RoMa.

The X-DC-Servo board – which controls the X-motors of the LiHa and RoMa – is described in Section 6.3.5, ‘Electronic Boards’.

Spare Parts

For spare parts list with part numbers refer to Section 7.1.3, ‘Spare Parts X-Drive Assembly’.

Following items can be replaced as spare parts:

- Belt tensioner
- X-belt (5.5 m)
- X-DC-Servo motor with cable and bracket

Overview X-Drive Assembly for LiHa

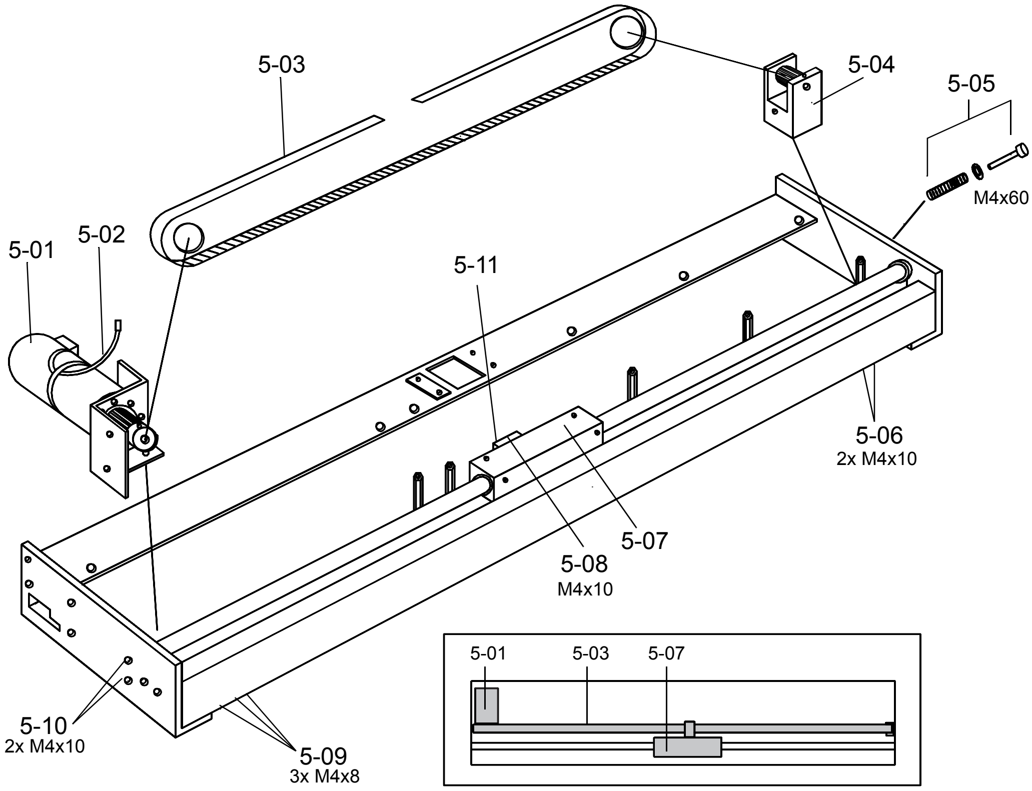


Figure 6-5 X-drive assembly for LiHa

5-01	X-motor LiHa	5-06	Fixing screw/washer for belt take-up
5-02	X-motor cable LiHa (J13)	5-07	X-slide LiHa
5-03	X-belt LiHa	5-08	Fixing screw for X-belt LiHa
5-04	Belt take-up LiHa	5-09	Fixing screw for X-motor LiHa
5-05	Belt tensioner (belt tensioning screw/ washer/pressure spring)	5-10	Fixing screw for X-motor LiHa
		5-11	Driver LiHa

Overview X-Drive Assembly for RoMa

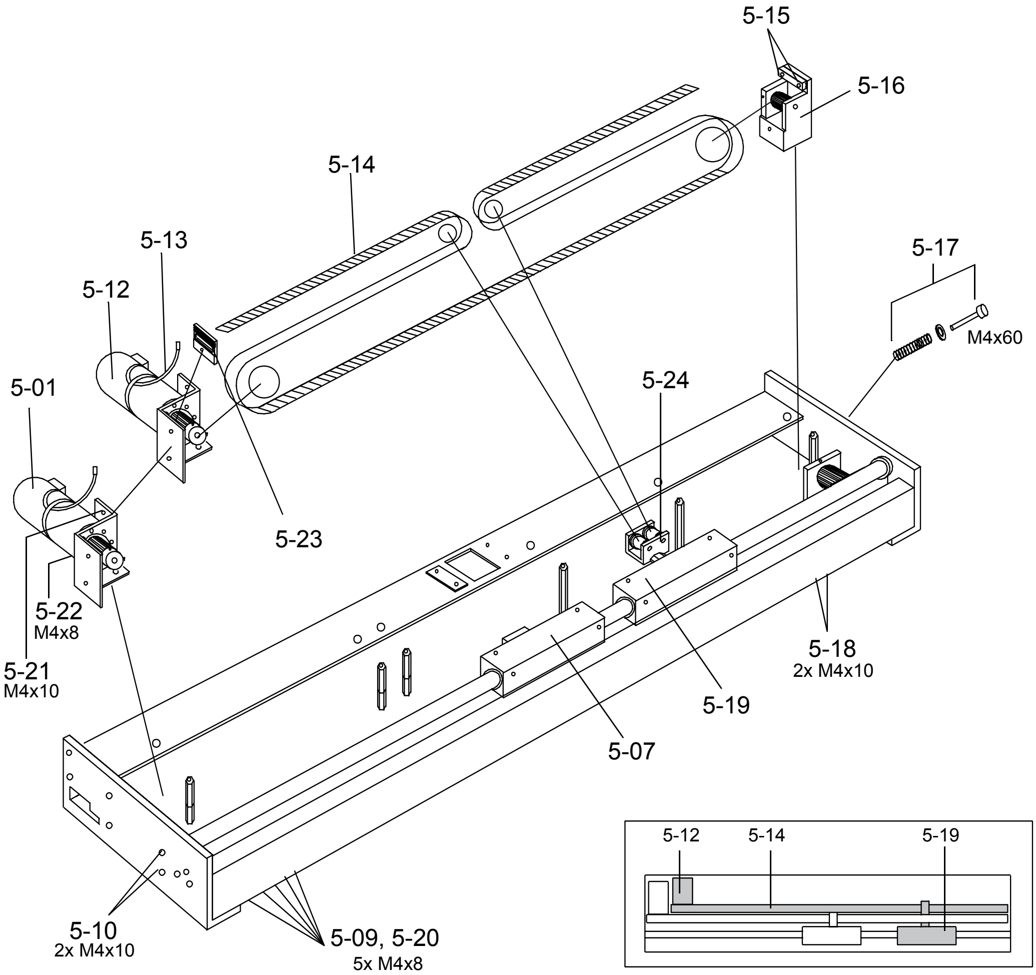

5-15
5-16
5-14
5-13
5-17
5-12
M4x60
5-01
5-24
5-23
5-22
M4x8
5-21
M4x10
5-18
2x M4x10
5-19
5-07
5-10
2x M4x10
5-09, 5-20
5x M4x8
5-12
5-14
5-19

Figure 6-6 X-drive assembly for RoMa

5-01	X-motor LiHa
5-07	X-slide LiHa
5-09	Fixing screw for X-motor LiHa
5-10	Fixing screw for X-motor LiHa
5-12	X-motor RoMa
5-13	X-motor cable RoMa (J09)
5-14	X-belt RoMa
5-15	Fixing screw for X-belt RoMa
5-16	Belt take-up RoMa
5-17	Belt tensioner (belt tensioning screw/ washer/pressure spring)
5-18	Fixing screw/washer for belt take-up
5-19	X-slide RoMa
5-20	Fixing screw for X-motor RoMa
5-21	Fixing screw for belt lock
5-22	Fixing screw for X-motor RoMa
5-23	Belt lock RoMa
5-24	Driver RoMa

Removal of X-Belt

For LiHa and RoMa X-Belt

The item numbers mentioned refer to Figure 6-5, 'X-drive assembly for LiHa' *and* Figure 6-6, 'X-drive assembly for RoMa'*.*

Note

In case the instrument is not yet equipped with the new belt tensioner (5-05 or 5-17), we recommend to upgrade the instrument when removing the X-belt.

1. Remove the arm of the relevant X-drive.
   For LiHa 1 see Section 6.5.2, 'Complete LiHa 1 Assembly',
   for LiHa 2 see Section 6.6.2, 'Complete LiHa 2 Assembly',
   for RoMa 1 see Section 6.7.2, 'Complete RoMa 1 Assembly'
   for RoMa 2 see Section 6.8.2, 'Complete RoMa 2 Assembly'.
2. Unscrew and remove the X-bay covers, open right access door (6).
3. For RMP instruments only:
   - Remove system liquid container.
   - Unscrew the steel plate supporting the Supervisor/Uniport board (41, 37) in order to get access to the belt tensioning screw (5-17).
4. From below the X-bay loosen the respective belt take-up fixing screws (5-06 or 5-18).
5. Loosen the respective belt tensioning screw (5-05 or 5-17) to slacken the X-belt tension.
6. For LiHa X-belt:
   - Open X-belt fixing screw (5-08), remove X-belt (5-03).

   For RoMa X-belt:
   - Open belt lock (5-23) and X-belt fixing screws (5-15), remove X-belt (5-14).

Installation of X-Belt

For LiHa X-Belt

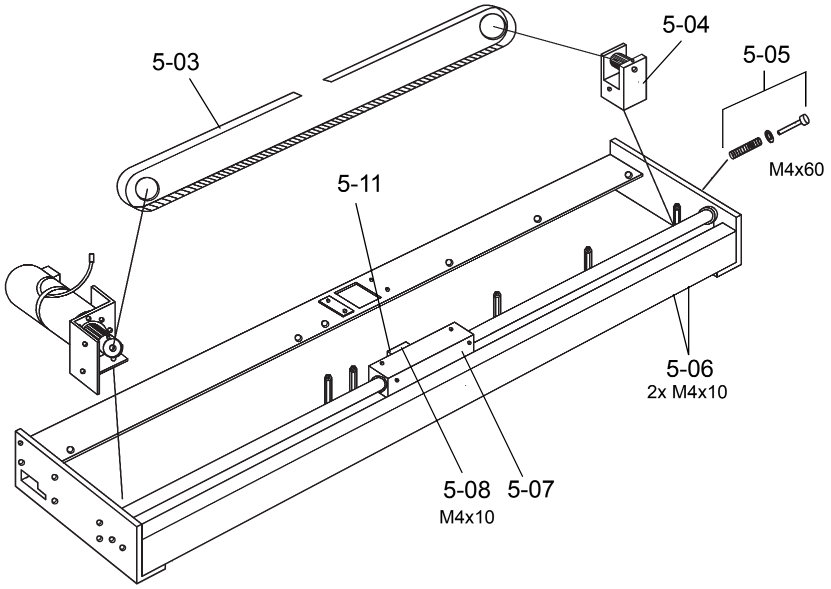


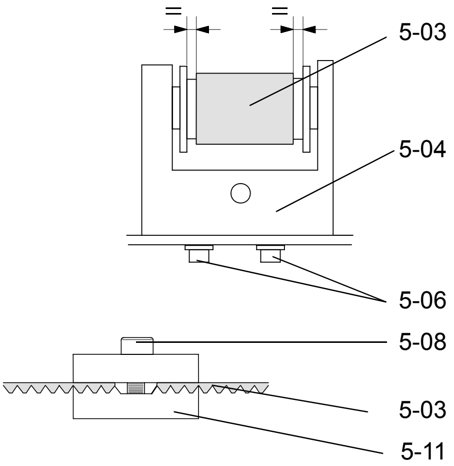
Figure 6-7 Installing X-belt LiHa

5-03	X-belt LiHa	5-06	Fixing screw/washer for belt take-up
5-04	Belt take-up LiHa	5-07	X-slide LiHa
5-05	Belt tensioner (belt tensioning screw/ washer/pressure spring)	5-08	Fixing screw for X-belt LiHa
		5-11	Driver LiHa

1. Cut the new belt to required size according to the replaced one.

2 If installed: remove belt tensioning screw (5-05).

3 Fix – but do not tighten yet – the belt take-up fixing screws (5-06) which should be positioned more likely in the left part of the slotted hole.



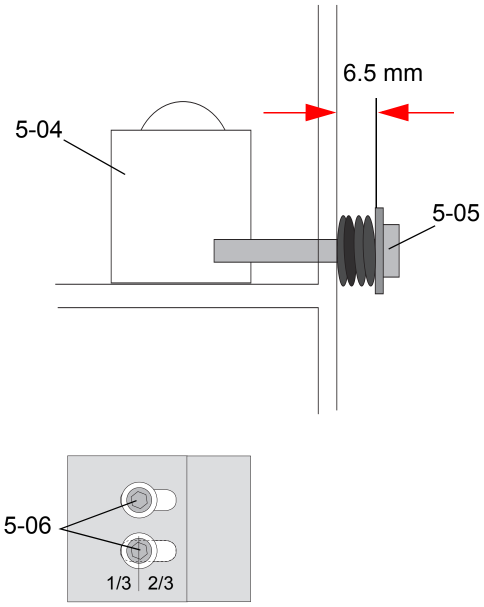
4 Lead the X-belt (5-03) over the pulleys as shown in Figure 6-7 and fasten it (fixing screw 5-08) in the driver (5-11).

Make sure the belt is placed correctly over the pulleys (Figure 6-8).

5-03	X-belt LiHa
5-04	Belt take-up LiHa
5-06	Fixing screw for belt take-up
5-08	Fixing screw for X-belt
5-11	Driver LiHa

Figure 6-8 X-belt LiHa

5 Loosen the fixing screws of the driver (5-11).



6 Screw the belt tensioning screw (5-05) with washer and pressure spring into the belt take-up (5-04) until the distance between inner face of the washer and the frame of the instrument is 6.5 mm (this corresponds to a tension of 9 N).

5-04	Belt take-up LiHa
5-05	Belt tensioning screw
5-06	Fixing screw for belt take-up

7 Check the position of the belt take-up fixing screws (5-06) in the slotted hole; it should be in the left third of the slot. Otherwise you need to shorten the X-belt.

Figure 6-9 Tensioning the X-belt LiHa

8 Tighten the belt take-up fixing screws (5-06) and glue them with Tree Bond 1342.

9 Reinstall LiHa (see Section 6.5.2, ‘Complete LiHa 1 Assembly’ or Section 6.6.2, ‘Complete LiHa 2 Assembly’) and ensure operating readiness as described in Section 6.5.10, ‘Ensure Operating Readiness’ (for LiHa 1) or Section 6.6.11, ‘Ensure Operating Readiness’ (for LiHa 2).

For RoMa X-Belt

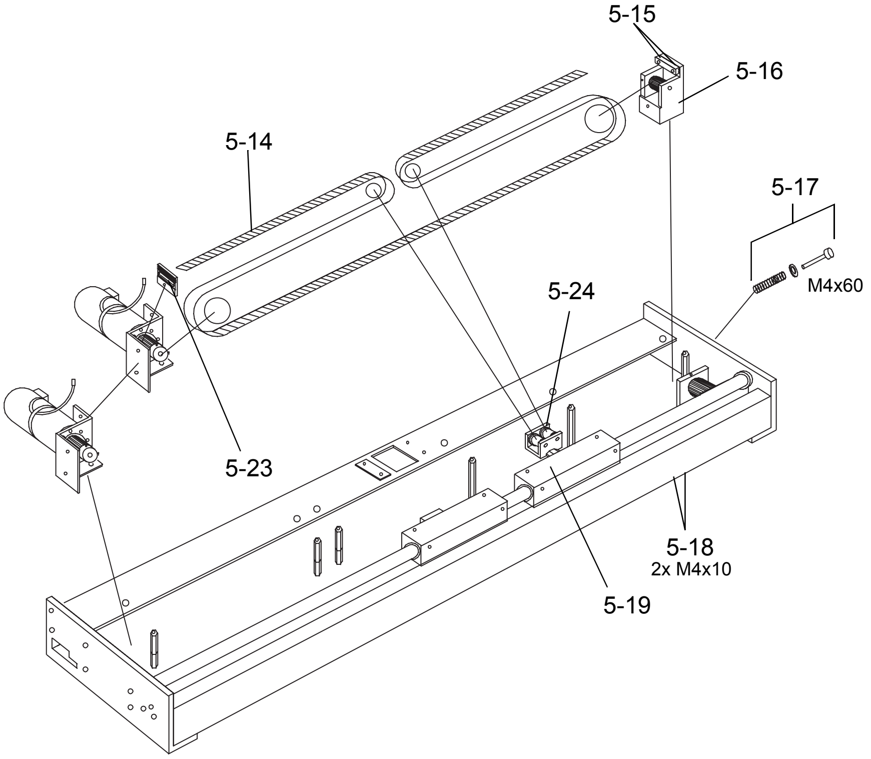


Figure 6-10 Installing X-belt RoMa

5-14	X-belt RoMa	5-18	Fixing screw/washer for belt take-up
5-15	Fixing screw for X-belt RoMa	5-19	X-slide RoMa
5-16	Belt take-up RoMa	5-23	Belt lock RoMa
5-17	Belt tensioner (belt tensioning screw/ washer/pressure spring)	5-24	Driver RoMa

1. Cut the new belt to required size according to the replaced one.
2. If installed: remove belt tensioning screw (5-17).
3. Fix – but do not tighten yet – the belt take-up fixing screws (5-18) which should be positioned more likely in the left part of the slotted hole.
4. Fix one end of the X-belt (5-14) in the belt lock (5-23), then lead it over the pulleys as shown in Figure 6-10. Insert the other belt end in the belt take-up (5-16) and fasten the fixing screws (5-15).

   Make sure the belt is placed correctly over the pulleys as shown in the upper illustration of Figure 6-8.
5. Loosen the fixing screws of the driver (5-24).
6. Screw the belt tensioning screw (5-17) with washer and pressure spring into the belt take-up (5-16) until the distance between inner face of the washer and the frame of the instrument is 6.5 mm (this corresponds to a tension of 9 N). (See Figure 6-11, ‘Tensioning the X-belt RoMa’.)

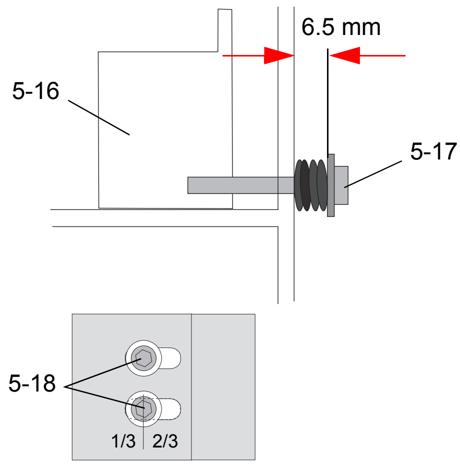


Figure 6-11 Tensioning the X-belt RoMa

5-16	Belt take-up RoMa
5-17	Belt tensioning screw
5-18	Fixing screw for belt take-up

7 Check the position of the belt take-up fixing screws (5-18) in the slotted hole; it should be in the left third of the slot. Otherwise you need to shorten the X-belt.

8 Tighten the belt take-up fixing screws (5-18) and glue them with Tree Bond 1342.

9 For RMP instruments only:

- Install the steel plate supporting the Supervisor/Uniport board (41, 37).
- Install system liquid container.

10 Install the X-bay covers.

11 Reinstall RoMa (see Section 6.7.2, ‘Complete RoMa 1 Assembly’ or Section 6.8.2, ‘Complete RoMa 2 Assembly’) and ensure operating readiness as described in Section 6.7.13, ‘Ensuring Operating Readiness’ (for RoMa 1) or Section 6.8.15, ‘Ensuring Operating Readiness’ (for RoMa 2).

Removal of X-motor

For Instruments without RoMa

The item numbers mentioned refer to Figure 6-5, ‘X-drive assembly for LiHa’.

1 Release tension of the X-belt as described earlier in this section (see ‘Removal of X-Belt’, step 1 to 4).

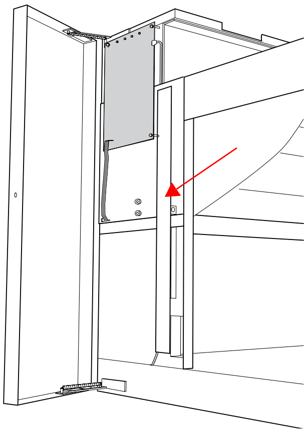


Figure 6-12 Tubing cover

2 Remove tubing cove

3 which is located in the left service compartment – to access the X-motor fixing screws 5-10 (see Figure 6-12).

4 Carefully disconnect the X-motor cable from the CU board (see Figure 6-22, ‘CU board cable connections’).

5 Open fixing screws (5-09, 5-10), remove X-motor (5-01).

Do not attempt to remove motor cable and bracket.

For Instruments with RoMa

The item numbers mentioned refer to Figure 6-6, 'X-drive assembly for RoMa'.

1. Release tension of both X-belts as described earlier in this section (see 'Removal of X-Belt', step 1 to 4), irrespective of which X-motor has to be replaced.
2. Take the RoMa X-belt (5-14) out of the belt lock (5-23).
3. Remove tubing cover – which is located in the left service compartment – to access the X-motor fixing screws (5-10) (see Figure 6-12, 'Tubing cover').
4. Carefully disconnect both X-motor cables from the CU board (see Figure 6-22, 'CU board cable connections').
5. Open fixing screws (5-09, 5-10, 5-20), remove complete X-motor assembly.
6. Unscrew fixing screw (5-22) to separate the two X-motors (5-01 and 5-12).

   Do not attempt to remove motor cable and bracket.

Installation of X-motor

For Instruments without RoMa

The replacement X-motor is delivered with cable and bracket.

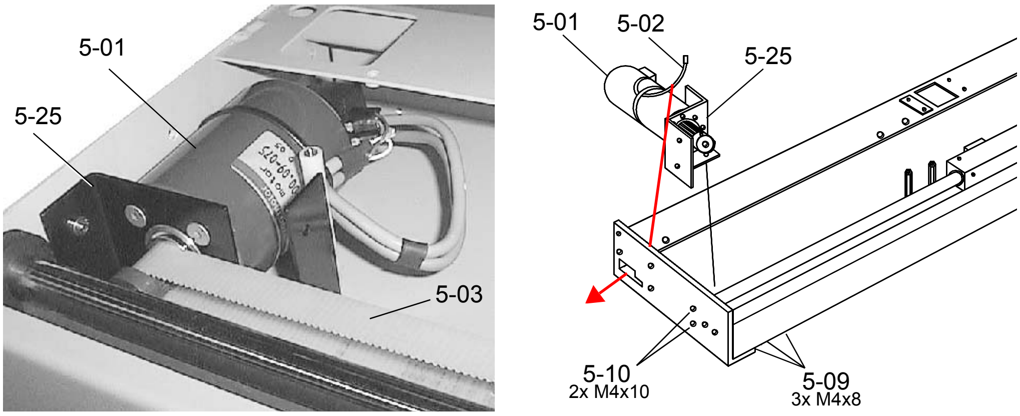


Figure 6-13 Installing X-motor LiHa

5-01	X-motor LiHa	5-09	Fixing screw for X-motor LiHa
5-02	X-motor cable LiHa (J13)	5-10	Fixing screw for X-motor LiHa
5-03	X-belt LiHa	5-25	Motor bracket

1. Install the X-motor (5-01) into the X-bay and tighten the fixing screws (5-09, 5-10).
2. Lead the X-motor cable trough the slot in the X-bay (see arrow in Figure 6-13) and connect it to the CU board (J13) (see Figure 6-22, 'CU board cable connections').
3. Install the X-belt (5-03) as described earlier in this section (see 'Installation of X-Belt', 'For LiHa X-Belt').
4. Install the tubing cover in the left service compartment (see Figure 6-12, 'Tubing cover').

5 Reinstall LiHa (see Section 6.5.2, ‘Complete LiHa 1 Assembly’ or Section 6.6.2, ‘Complete LiHa 2 Assembly’) and ensure operating readiness as described in Section 6.5.10, ‘Ensure Operating Readiness’ (for LiHa 1) or Section 6.6.11, ‘Ensure Operating Readiness’ (for LiHa 2).

For Instruments with RoMa

The replacement X-motor is delivered with cable and bracket.

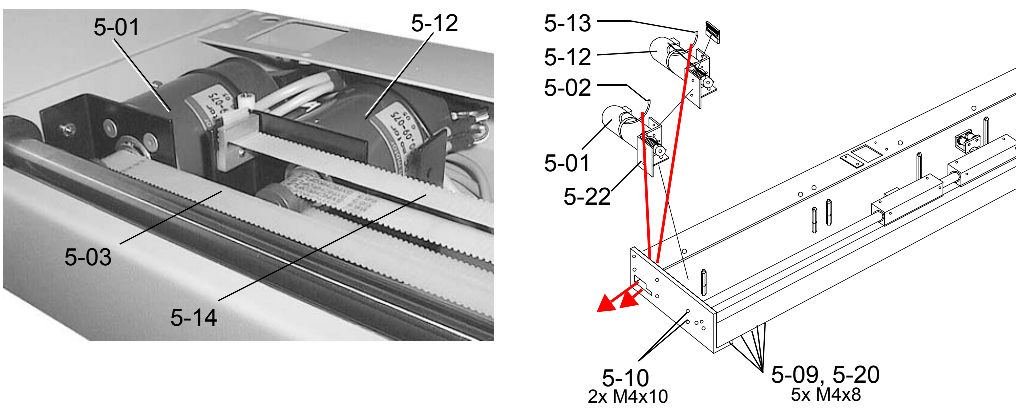


Figure 6-14 Installing the X-motors

5-01	X-motor LiHa	5-12	X-motor RoMa
5-02	X-motor cable LiHa (J13)	5-13	X-motor cable RoMa (J09)
5-03	X-belt LiHa	5-14	X-belt RoMa
5-09	Fixing screw for X-motor LiHa	5-20	Fixing screw for X-motor RoMa
5-10	Fixing screw for X-motor LiHa	5-22	Fixing screw for X-motor RoMa

1 Place the two X-motors (5-01) and (5-12) on a plane surface and tighten the fixing screw (5-22).

2 Install the X-motor assembly into the X-bay; first tighten the fixing screws (5-09) and (5-20), then the fixing screws (5-10).

3 Lead both X-motor cables trough the slot in the X-bay (see arrows in Figure 6-14) and connect them to the CU board (J13 = LiHa, J09 = RoMa) (see Figure 6-22, ‘CU board cable connections’).

4 Install the X-belts (5-03, 5-14) as described earlier in this section (see ‘Installation of X-Belt’).

5 Install the tubing cover in the left service compartment (see Figure 6-12, ‘Tubing cover’).

6 Reinstall LiHa (see Section 6.5.2, ‘Complete LiHa 1 Assembly’ or Section 6.6.2, ‘Complete LiHa 2 Assembly’).

7 Reinstall RoMa (see Section 6.7.2, ‘Complete RoMa 1 Assembly’ or Section 6.8.2, ‘Complete RoMa 2 Assembly’.

8 Ensure operating readiness as described in

- Section 6.5.10, ‘Ensure Operating Readiness’ (for LiHa 1) or
- Section 6.6.11, ‘Ensure Operating Readiness’ (for LiHa 2) and
- Section 6.7.13, ‘Ensuring Operating Readiness’ (for RoMa 1) or
- Section 6.8.15, ‘Ensuring Operating Readiness’ (for RoMa 2).

6.3.4 Power Modules

Note

- *The old generation of power modules for Genesis RSP and RWS are replaced by the power modules PM 1, PM 2 and PM 4 as of September 2001.*
- *For supply ratings and allocation to the different Genesis instruments refer to Section 3.1.2, 'Supply Ratings'.*
- For more information about wiring of the power module see the appropriate wiring diagram in Section 9.2.1, 'Power Modules'.
- *Check power rating printed on the type plate of the instrument for correct identification.*

Spare Parts Power Modules

For spare parts list with part numbers refer to Section 7.1.4, 'Spare Parts Power Modules'.

Following item can be replaced as spare parts:

- Power module

The power module as a whole part is a spare part.
For safety reasons no replacement of items is allowed. Do not attempt to perform repairs within this part. Faulty wiring will seriously endanger user and instrument.

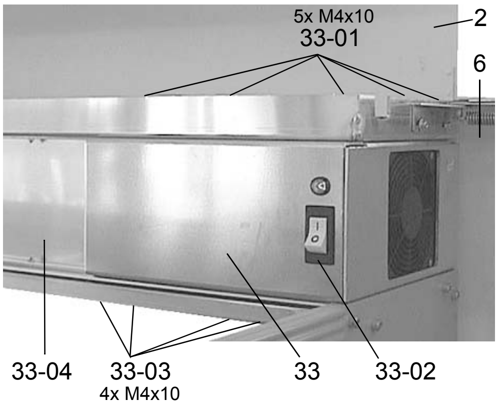
Following descriptions are valid for the old and the new types of power modules.

Switch off the mains power and disconnect the mains power connection of the instrument before performing any work!

Removal

The item numbers mentioned refer to Figure 6-15.

1. Make sure the instrument is not connected to the mains and the power switch is off.
2. Move arm(s) to the middle of the instrument, open top cover (2) and right access door (6).
3. Unscrew possibly present panel (33-04) between diluter compartment and power module (33).
4. Remove the fixing screws (33-03), the fixing screws and sealing washers (33-01).



2	Top cover
6	Right access door
33	Power module (old generation)
33-01	Fixing screws with sealing washers
33-02	Power switch
33-03	Fixing screws
33-04	Panel

Figure 6-15 Power module (old generation) on Genesis RSP instrument

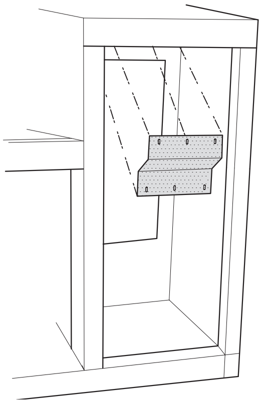


Figure 6-16 Connector shield on RMP instrument

5 For RMP:

- Unscrew the connector sheet (see Figure 6-16).
- Unscrew the earth cable (33-05) from instrument frame and disconnect the mains power cable from the power switch (see Figure 6-18, 'Power switch for RMP').
- Disconnect the control lamp cable from the control lamp (access from the right access door).

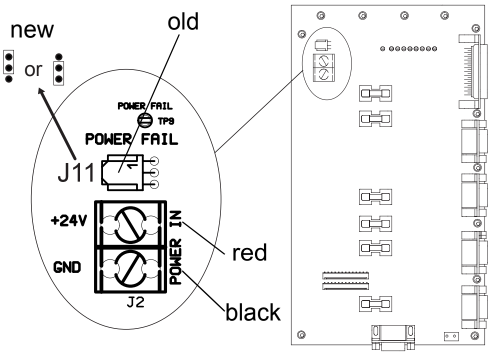


Figure 6-17 Connection to Optibo

6 Disconnect the red and black power cables from the Optibo/Optibo Power (see Figure 6-17, 'Connection to Optibo').

7 For old generation of power modules: disconnect the power fail cable from the Optibo/Optibo Power.

Note: for the new power modules the jumper J11 must be set on Optibo/ Optibo Power.

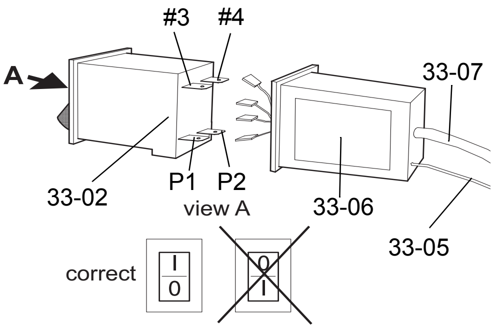
8 Remove the power module by carefully pulling forward.

Installation

Switch off the mains power and disconnect the mains power connection of the instrument before performing any work!

1 Install in reverse order.
In doing so, observe the directions given hereafter:

- For RMP: when installing the power switch, note the installation diagram (33-06) and the correct orientation of the switch according to Figure 6-18.



33-02	Power switch
33-05	Earth cable
33-06	Installation diagram
33-07	Mains power cable

Figure 6-18 Power switch for RMP

- When fixing the power module to its place: tighten the fixing screws (33-03) first, hereafter the fixing screws (33-01).
  Do not forget the sealing washers on all top screws (33-01).
  (The item numbers mentioned refer to Figure 6-15).
- Tip for leading the power cables easily through the cable channel: fix the cables together with a strip of adhesive tape.
  Refer to Figure 6-17, 'Connection to Optibo' for correct cable connection.
- Before connecting the instrument to the mains, make sure the power switch is switched off.

2 Ensure operating readiness: control and carry out following settings:

(For detailed information refer to the Genesis Instrument Software Manual.)

Step	Test or Setup
1	Random move *Attention: never perform a random move test with a Genesis RMP!*
2	Liquid detection

6.3.5 Electronic Boards

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.
Wear a wrist strap.

Spare Parts Covered in This Section

For spare parts list with part numbers refer to Section 7.1.5, 'Spare Parts Electronic Boards'.

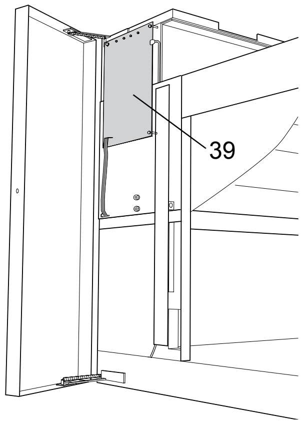
Following items can be replaced as spare parts:

- Optibo
- Optibo Power
- Fuses
- CU board
- X-DC-Servo board
- Supervisor board
- Uniport board
- CANDI board
- SMIO/SAFY

The PosID 1 CU board and the PosID 2 CU board are described in Section 6.9.3, 'Electronic Boards for PosID 1' *and* Section 6.10.3, 'Electronic Boards for PosID 2'.

Optibo, Optibo Power

Optibo: for all RSP, all RMP and for RWS 100
Optibo Power: for RWS 150/200



The Optibo is located in the left service compartment. On its rear side it holds the CU board and, plugged into latter, the X-DC-Servo board which controls the X-motor(s) for LiHa and RoMa.

39	Optibo/Optibo Power

Figure 6-19 Optibo or Optibo Power location

Removal

1 Make sure the instrument is switched off and the mains power connection is disconnected.

2 Disconnect all cables from Optibo/Optibo Power.
Do not forget to disconnect the Diluter cable on the solder side of the PCB.

3 Disconnect all cables from the CU board.

4 Remove Optibo/Optibo Power fixing screws, take care not to damage the PCBs connected to the Optibo/Optibo Power rear side.

5 Disconnect CU board from Optibo/Optibo Power as described later in this section.

Installation

1 Make sure the instrument is switched off and the mains power connection is disconnected.

2 Make sure the CU board and X-DC-Servo board (address switch must be set to #5) are connected to the Optibo/Optibo Power rear side.

3 Control if the jumpers J12 and J13 on Optibo/Optibo Power have been set correctly according to the configuration of the instrument (see Section 6.2.2, ‘Jumper and Address Settings Overview’).

4 Install in reverse order.

For correct cable connection see Figure 6-20, ‘Optibo cable connections’ *and* Figure 6-22, ‘CU board cable connections’.

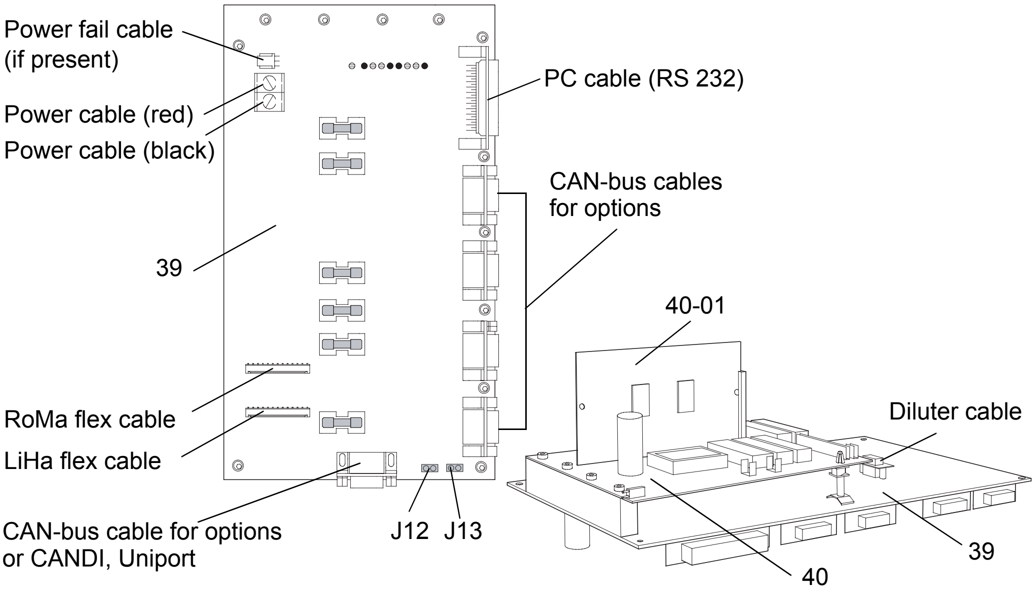

Power fail cable
(if present)
Power cable (red)
Power cable (black)
39
RoMa flex cable
LiHa flex cable
CAN-bus cable for options
or CANDI, Uniport
J12
J13
PC cable (RS 232)
CAN-bus cables
for options
40-01
Diluter cable
39
40

Figure 6-20 Optibo cable connections

39	Optibo
40	CU board
40-01	X-DC-Servo board (LiHa/RoMa)

5 Ensure operating readiness: control and carry out following tests:

(For detailed information refer to the Genesis Instrument Software Manual.)

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	RoMa test
3	FWO pump test
4	PosID test
5	Incubator test
6	Random move *Attention: never perform a random move test with a Genesis RMP!*

Fuses

The fuses are located on the Optibo or Optibo Power.

See Figure 6-21, 'Fuses on Optibo and Optibo Power' *for correct allocation.*

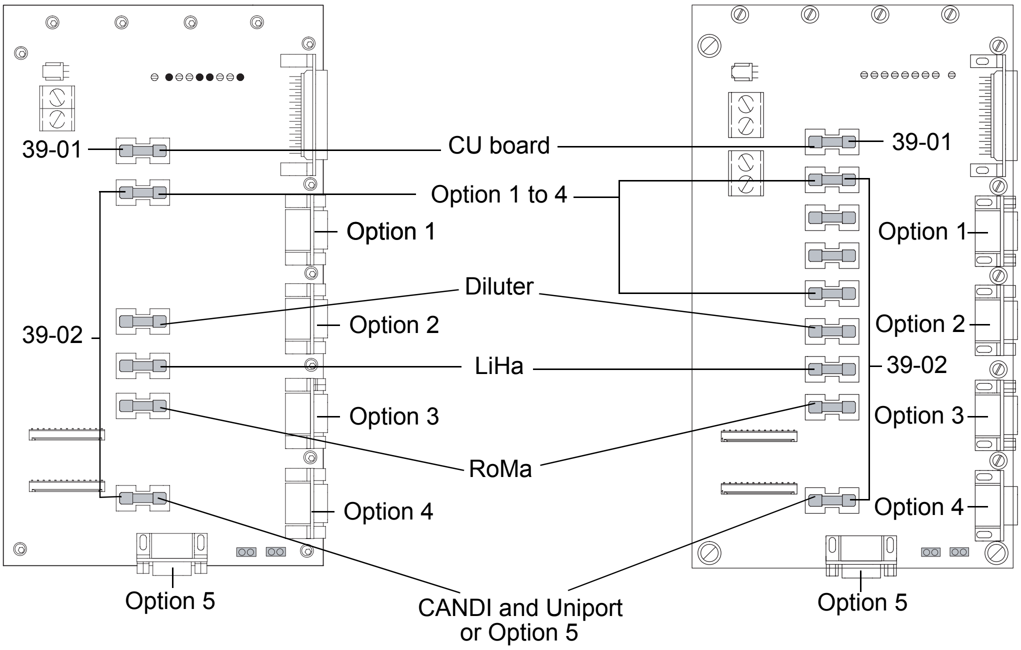

39-01
CU board
39-01
Option 1 to 4
Option 1
Option 1
Diluter
39-02
Option 2
Option 2
LiHa
39-02
Option 3
Option 3
RoMa
Option 4
Option 4
Option 5
CANDI and Uniport
or Option 5
Option 5

Figure 6-21 Fuses on Optibo and Optibo Power

39-01	Fuse 6.3 AT
39-02	Fuse 8 AT, sand filled

1 Check if all the green LEDs near the fuses are on; otherwise the corresponding fuse is blown.

.

Use sand filled 8 AT type fuses only – except for the fuse for the CU board, which is 6.3 AT and not sand filled.

CU Board

The CU board is located in the left service compartment. As it is connected to the solder side of the Optibo or Optibo Power, it can only be accessed by removing the Optibo/ Optibo Power.

The X-DC-Servo board, which controls the X-motors of the LiHa and RoMa, is plugged into the CU board.

Special Tools

- IC release tool

Removal

1 Switch off instrument.

2 Remove Optibo/Optibo Power as described earlier in this section (see Optibo, Optibo Power).

3 Unscrew the CU board fixing screws. With a pair of pliers press the barbs on the two board clips, carefully remove the CU board from the Optibo/Optibo Power.

4 Remove X-DC-Servo board.

5 Use IC release tool to remove the EEPROM (IC6) if you want to install it on the new board (see Figure 6-22, ‘CU board cable connections’).

Use of EEPROM from the replaced CU board ⇨ an error might be carried forward.

Use of new EEPROM ⇨ you loose all settings.

Installation

Spare CU boards may be delivered with an older firmware version. In this case, upgrading of the firmware is necessary.

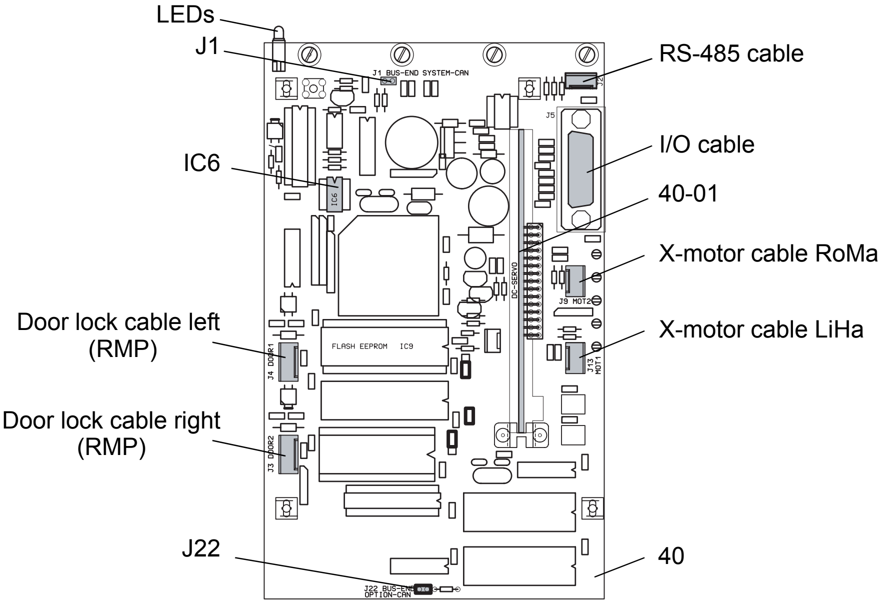

LEDs
J1
J1 BUS-END SYSTEM-CAN
RS-485 cable
J2
J5
I/O cable
IC6
40-01
DC-SERVO
X-motor cable RoMa
J9 MOT2
Door lock cable left (RMP)
J4 DOOR1
FLASH EEPROM IC9
X-motor cable LiHa
J13 MOT1
Door lock cable right (RMP)
J3 DOOR2
J22
J22 BUS-END OPTION-CAN
40

Figure 6-22 CU board cable connections

40	CU board	40-01	X-DC-Servo board

1 Control if the jumpers J1 and J22 on the CU board have been set correctly according to the configuration of the instrument (see Section 6.2.2, 'Jumper and Address Settings Overview').

2 X-DC-Servo board: check if address switch is set to #5.

3 Install in reverse order.

Refer to Figure 6-22, 'CU board cable connections' *for correct cable connections.*

4 Ensure operating readiness: control and carry out following tests:

(For detailed information refer to the Genesis Instrument Software Manual.)

Step	**Test or Setup**
1	CAN-bus resistance (see Section 6.2.3)
2	'Check Error States' as described later in this section
3	Check reference positions – LiHa – RoMa
4	Liquid detection test
5	Disposable tips (DiTi eject test)
6	Precision test
7	RoMa
8	FWO pump test
9	LICOS test
10	PosID test
11	Door lock test (RMP only)
12	Random move *Attention: never perform a random move test with a Genesis RMP!*

Check Error States

- Check the LEDs on the CU board according to the following table:

Green LED	**Red LED**	**Error**
blinking	off	Normal operation
stays on or off	stays on or off	Fatal hardware error
blinking	on	Flash not accessible
blinking	blinking	Power fail circuit failure
blinking fast	blinking fast	Firmware download required

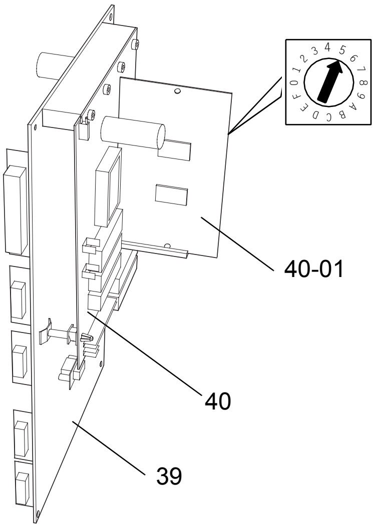
X-DC-Servo Board *The X-DC-Servo board – which controls the X-motors of the LiHa and RoMa – is plugged into the CU board that in turn is connected to the solder side of the Optibo/ Optibo Power.*

It is not necessary to remove the Optibo/Optibo Power to access the X-DC-Servo board.

Removal

- From inside of the instrument remove the X-DC-Servo board from the CU board.

Installation



1 Set address switch of the X-DC-Servo board to #5.

2 From within the instrument, connect the X-DC-Servo board to the CU board.

39	Optibo/Optibo Power
40	CU board
40-01	X-DC-Servo board

Figure 6-23 X-DC-Servo board, connected to the CU board

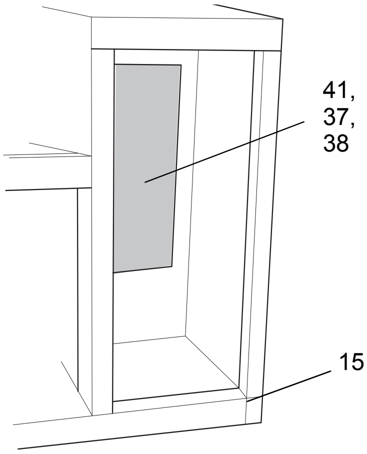
3 Ensure operating readiness: control and carry out following test:

(For detailed information refer to the Genesis Instrument Software Manual.)

Step	Test or Setup
1	Random move *Attention: never perform a random move test with a Genesis RMP!*

Supervisor Board, Uniport Board, CANDI Board

For RMP Instruments

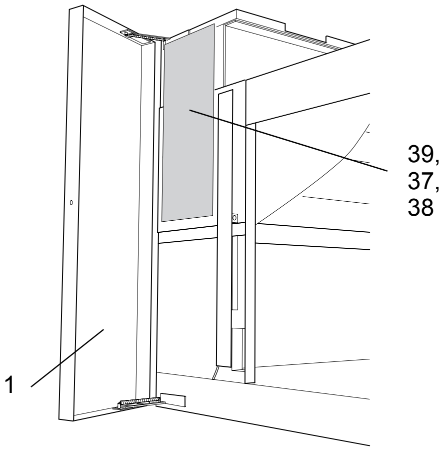


The Supervisor and the Uniport boards are located in the right service compartment of the add-on module. The CANDI board may be installed either in the left service compartment (directly connected to the Optibo/Optibo Power) or in the right service compartment (connected to the Uniport).

15	Add-on module
37	Uniport board
38	CANDI board
41	Supervisor board

Figure 6-24 PCB location for RMP instruments

For RSP/RWS Instruments



There is no Supervisor board necessary. The Uniport and CANDI boards may be installed either in the left service compartment (directly connected to the Optibo/Optibo Power) or in the right service compartment (connected via cable to the Optibo/Optibo Power).

1	Left access door
37	Uniport board
38	CANDI board
39	Optibo/Optibo Power

Figure 6-25 PCB location for RSP/RWS instruments

Special Tools

- IC release tool

Removal of Supervisor, Uniport, CANDI Board

STOP

The Firmware version on the new Supervisor board must be identical with the version on the now installed Supervisor board. Therefore check the Firmware version prior to replacing this PCB.

Default Firmware version on all new Supervisor PCBs is V1.21. However, an EPROM with the Supervisor Firmware V1.11 is enclosed to the delivery of a new board.

1 For Supervisor board:
   - If the Firmware version of the installed PCB is different to the one on the new PCB, remove EPROM (IC7) from the installed PCB using an IC release tool.
   - Disconnect LICOS and waste tubing from Supervisor board.

2 Disconnect all cables from the PCB to be removed.

3 Remove appropriate board fixing screws.

4 Carefully disconnect the board from the other connected board and remove it.

Installation

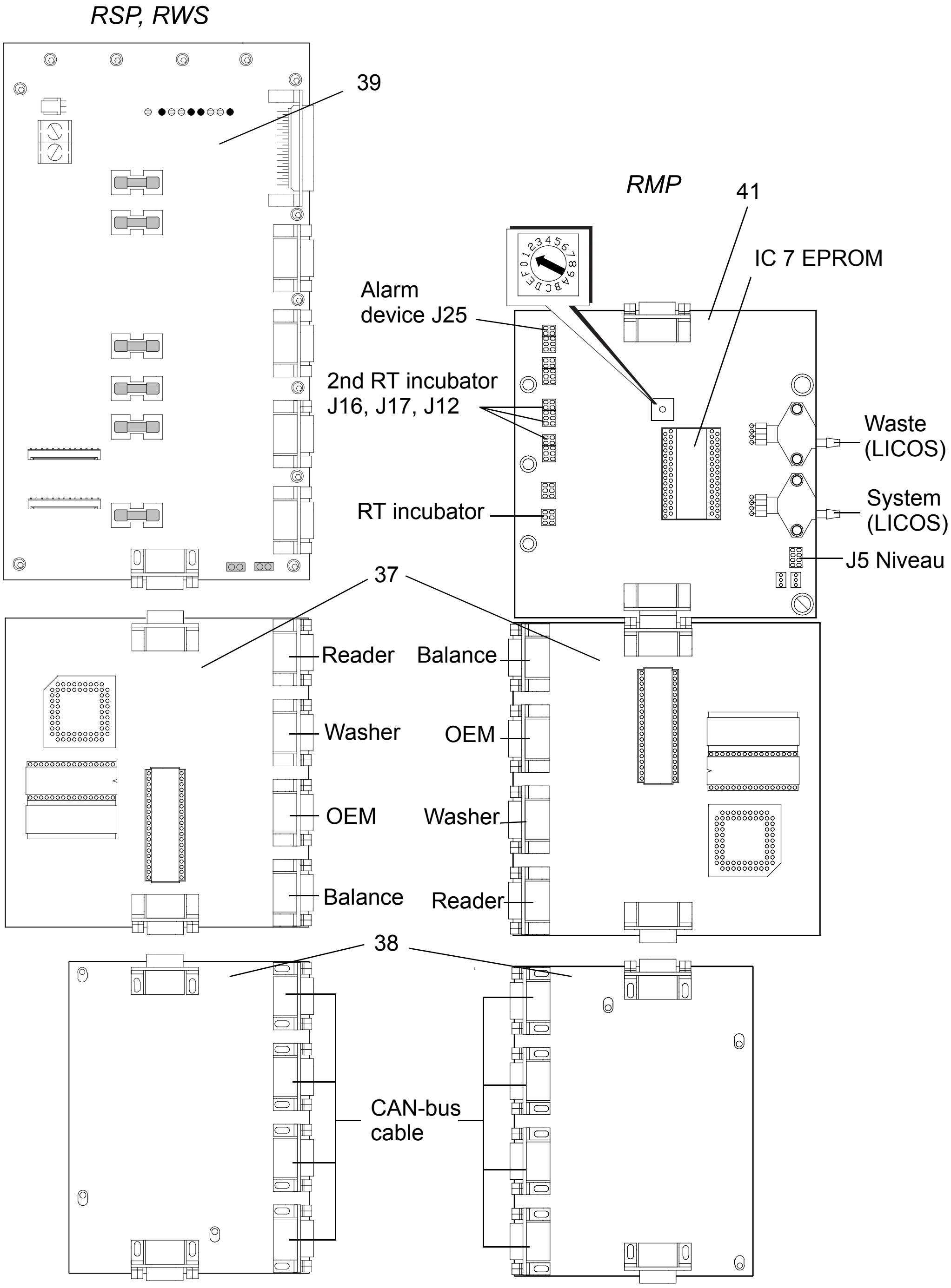

RSP, RWS
39
RMP
41
IC 7 EPROM
Alarm device J25
2nd RT incubator J16, J17, J12
Waste (LICOS)
System (LICOS)
RT incubator
J5 Niveau
37
Reader
Balance
Washer
OEM
OEM
Washer
Balance
Reader
38
CAN-bus cable

Figure 6-26 Cable connections on Supervisor, Uniport and CANDI boards

37	Uniport board	39	Optibo/Optibo Power
38	CANDI board	41	Supervisor board

1. For Supervisor board:
   - If necessary: install the EPROM (IC7) with the correct Firmware version on the PCB.
   - Control if address switch of the Supervisor board is set to #1.
2. Install in reverse order.

   For correct cable connection refer to the respective diagram in Section 9.2.2, ‘Electronic Boards’ *or to* Section Figure 6-26, ‘Cable connections on Supervisor, Uniport and CANDI boards’.
3. For Uniport:
   - Ensure operating readiness: control and carry out following tests:

   (For detailed information refer to the Genesis Instrument Software Manual.)

Step	**Test or Setup**
1	CAN-bus resistance (see Section 6.2.3)
2	Washer test
3	Reader test

SMIO/SAFY

The SMIO/SAFY is located in the right service compartment (connected via cable to the Optibo/Optibo Power).

The SMIO/SAFY is part of the access option for RSP and RWS instruments. Please refer to Document Doc ID 392 330 for further information.

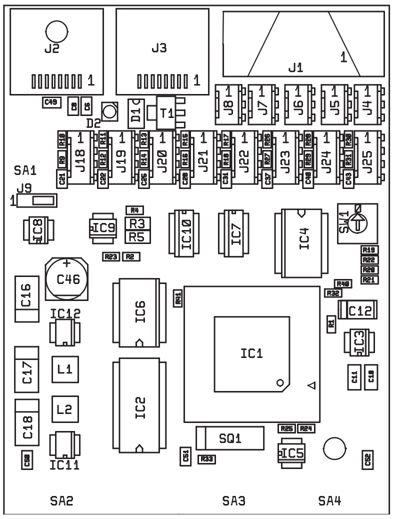

J2
J3
J1
1
J8
J7
J6
J5
J4
D1
T1
D2
J18
J19
J20
J21
J22
J23
J24
J25
SA1
J9
IC8
IC9
R3
R5
IC10
IC7
IC4
SW1
0
C46
C16
IC12
IC6
IC1
C12
IC3
C17
L1
L2
IC2
C18
IC11
SQ1
IC5
SA2
SA3
SA4

Figure 6-27 SMIO/SAFY

6.4 Liquid System – Disassembly and Assembly Procedures

6.4.1 Overview

Definition of Liquid System

The term “liquid system” refers to all instrument modules and parts which contain or directly influence liquid. These main components are:

• LiHa 1 and LiHa 2	(see Section 6.5 and Section 6.6)
• Tips	(refer to respective Instrument Operating Manual)
• Tubing system	(see Section 6.4.2)
• Diluter/Dilback	(see Section 6.4.3)
• MPO/FWO*	(see Section 6.4.4)
• Low volume option*	(see Section 6.4.5)
• 6-way valve option*	(see Section 6.4.6)

Components marked with an asterisk (*) are optional and therefore not available on all instruments.

Standard Liquid System for RSP and RWS

The following figure shows the main components of a standard liquid system for RSP or RWS instruments with 8 tips and optional FWO/MPO*.

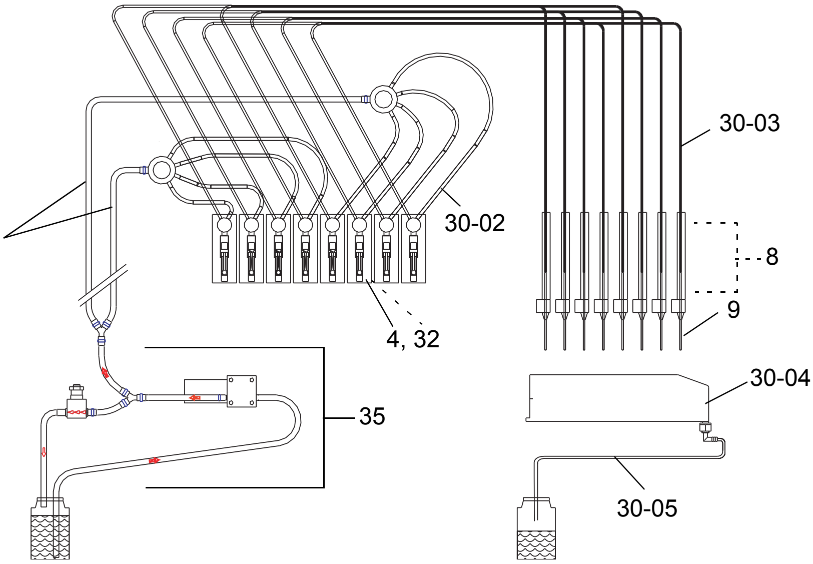


Figure 6-28 Overview of standard liquid system for RSP/RWS with 8 tips and MPO/FWO

4	Diluter	30-03	Pipetting tubing
8	LiHa1, LiHa 2	30-04	Wash station
9	Tips	30-05	Waste tubing
30-01	Aspiration tubing	32	Dilback
30-02	Interconnecting tubing	35	MPO/FWO

Standard Liquid System for RMP

The following figure shows the main components of a standard liquid system for RMP instruments with 8 tips and optional MPO/FWO*.

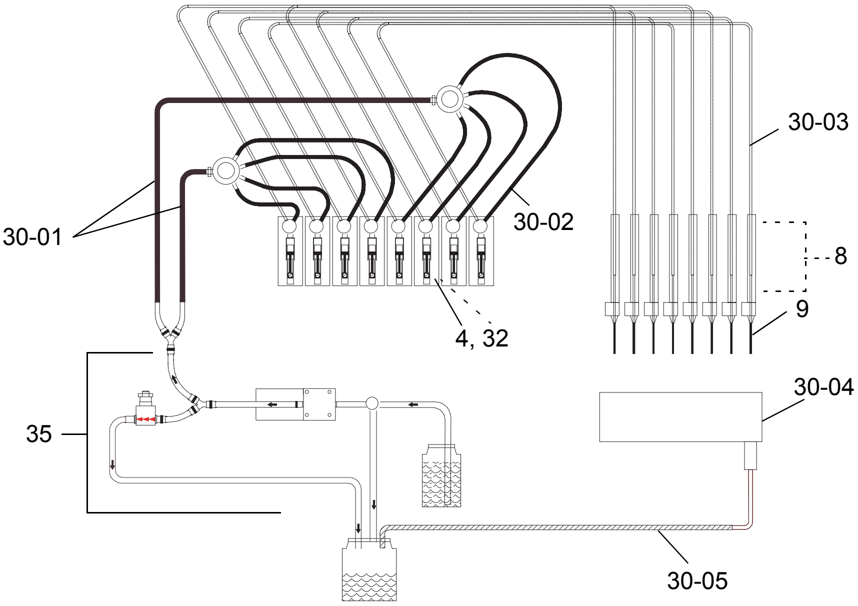


Figure 6-29 Overview of standard liquid system for RMP with 8 tips and MPO/FWO

4	Diluter	30-03	Pipetting tubing
8	LiHa1, LiHa 2	30-04	Wash station
9	Tips	30-05	Waste tubing
30-01	Aspiration tubing	32	Dilback
30-02	Interconnecting tubing	35	MPO/FWO

6.4.2 Tubing System

This section describes the customary tubing system which is available in three material variants: standard, high resistant type A, high resistant type B.

For the MPO/FWO tubing system refer to Section 6.4.4.
For the Low volume option tubing system refer to Section 6.4.5.
For 6-way option tubing system refer to Section 6.4.6.

Spare Parts

For spare parts list with part numbers refer to Section 7.2.1, 'Spare Parts Tubing Systems'.

Following items can be replaced as spare parts:

- Tubing and fittings for Standard Tubing
- Tubing and fittings for High Resistant Tubing Type A (FEP/PVDF)
- Tubing and fittings for High Resistant Tubing Type B (FEP/PP)

Standard Tubing

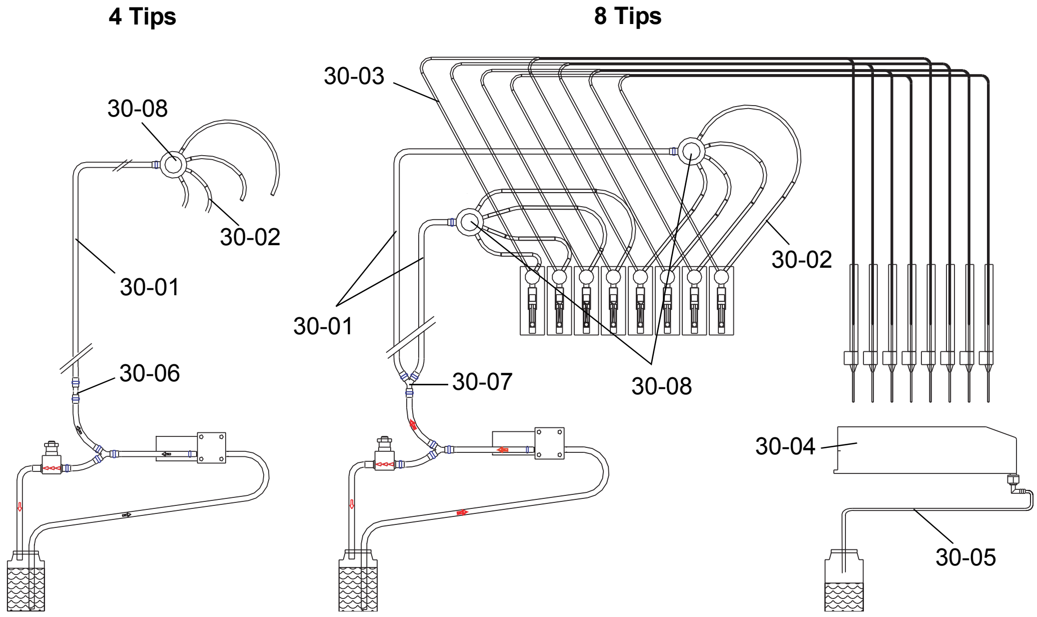

4 Tips
8 Tips
30-08
30-02
30-01
30-06
30-03
30-01
30-07
30-08
30-02
30-04
30-05

Figure 6-30 Standard tubing

30-01	Aspiration tubing	30-05	Waste tubing
30-02	Interconnecting tubing	30-06	I-connector
30-03	Pipetting tubing	30-07	Y-connector
30-04	Wash station	30-08	Distributor 1 to 4

High Resistant Tubing Type A and Type B

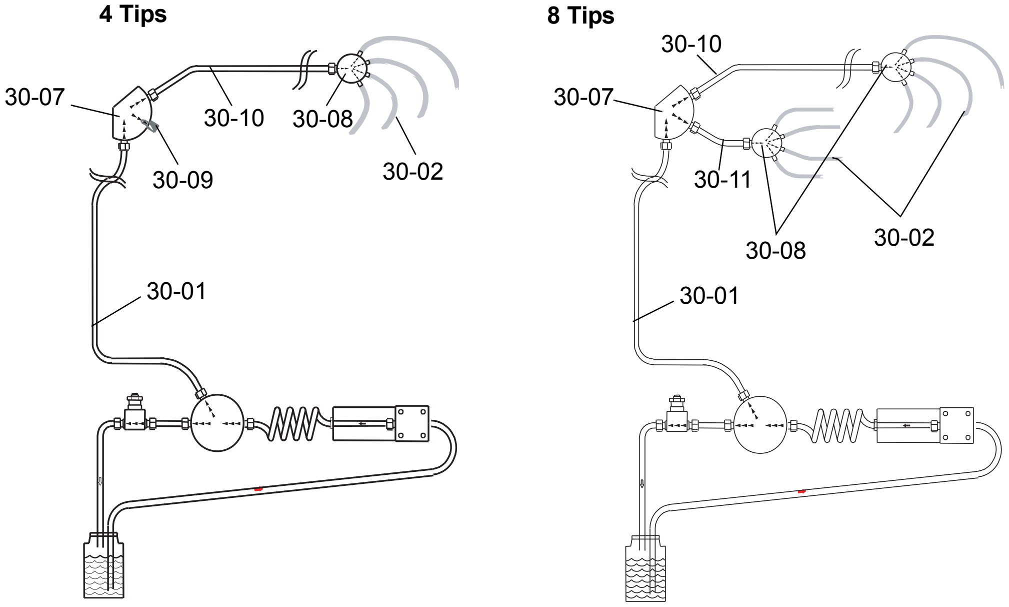

4 Tips
8 Tips
30-07
30-10
30-08
30-09
30-02
30-01
30-10
30-07
30-11
30-08
30-02
30-01

Figure 6-31 High resistant tubing type A and B

30-01	Aspiration tubing	30-08	Distributor 1 to 4
30-02	Interconnecting tubing	30-09	Screw plug
30-07	Distributor 1 to 2	30-10/11	Tubing to distributor 1 to 4

Replacement

WARNING

The liquid system may contain compounds hazardous to your health.
Make sure the complete liquid system has been properly decontaminated before you perform any service tasks.

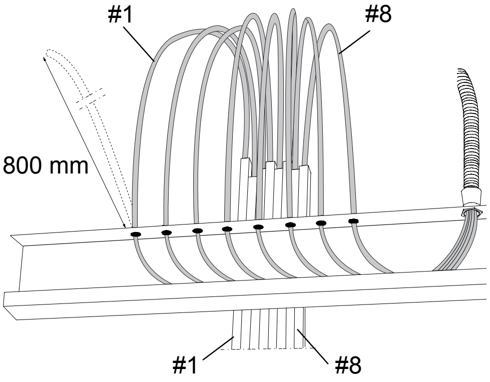


Figure 6-32 Installing the pipetting tubing

1. Empty the liquid system.
2. Switch off the instrument.
3. Replace relevant tubing.

   For detailed descriptions of the exchange routines please refer to the Genesis Maintenance and Service Logbook Doc ID 390 924.

   - When replacing the pipetting tubing: diluter #1 (on the far left) is connected to tip #1 (the closest to the back of the instrument), diluter #2 to tip #2 etc.
   - Adjust all pipetting tubing length to 800 mm.
     Do not cut the remaining tubing, but pull it back and place it in the liquid pan of the instrument.
4. Ensure Operating Readiness:
   - Tightness check
   - FaWa pump test
   - Precision test

   … as described later in this section.

Ensure Operating Readiness

Step	Test or Setup
1	– Tightness check: fill/flush system and check all tubing connections – FaWa pump test *Necessary after replacement of* • *Pipetting tubing* • *Interconnecting tubing* • *Aspiration tubing*
2	– Precision test *Necessary after replacement of* • *Pipetting tubing* • *Interconnecting tubing*

6.4.3 Diluter and Dilback

Spare Parts

For spare parts list with part numbers refer to Section 7.2.2, 'Spare Parts Diluter/ Dilback'.

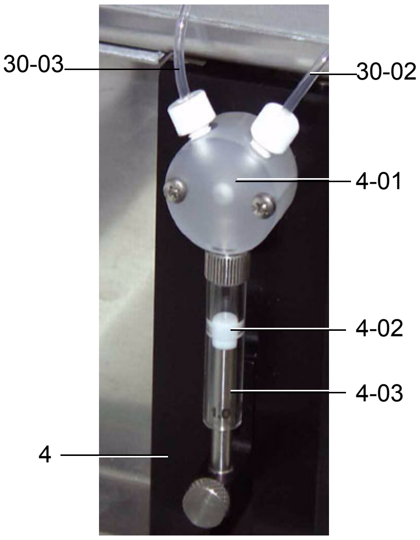
Following items can be replaced as spare parts:

- Diluters
  XP 3000
  XP 3000 plus
- Diluter spare part
  3-way valve
  Syringe with flat caps, Syringe with conical caps
  Syringe caps, flat, Syringe caps, conical
- Dilback-8

Diluter XP 3000, XP 3000 Plus

Diluter type XP 3000 is installed on RSP, RMP and RWS instruments up to serial number 4999.
Diluter type XP 3000 plus is installed on RSP, RMP and RWS instruments with serial numbers ≥ 5000.

Overview



4	Diluter XP 3000 or XP 3000 plus
4-01	3-way valve
4-02	Syringe cap
4-03	Syringe
30-02	Interconnecting tubing (in)
30-03	Pipetting tubing (out)

Figure 6-33 Diluter – principal components

Removal

1. Empty the liquid system.
2. Switch off the instrument.
3. Open the top cover (2) of the instrument.

4 Disconnect the tubing from the 3-way valve (4-01)

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.
Wear a wrist strap.

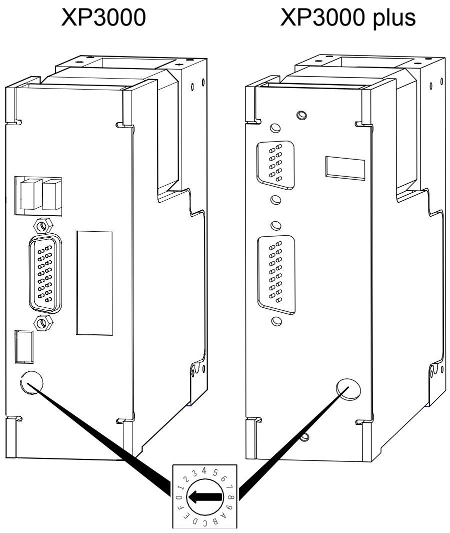
5 Unscrew the diluter (4) from the instrument (1 screw M3x12 with washer underneath the diluter).
Make sure not to mistake the steel sheet screws for the diluter screws.

6 Carefully pull the diluter out of the instrument.

Installation

1 Install in reverse order.

- Check the CAN-bus address on the backside of the diluter:



Address setting:

Diluter 1	#0
Diluter 2	#1
Diluter 3	#2
Diluter 4	#3
Diluter 5	#4
Diluter 6	#5
Diluter 7	#6
Diluter 8	#7

Diluter 1 is the most left diluter.

Figure 6-34 Diluter address settings

- Adjust the distance between the diluters by means of a 0.2 mm thickness gauge.

2 Make sure the liquid system is tight (visual check).

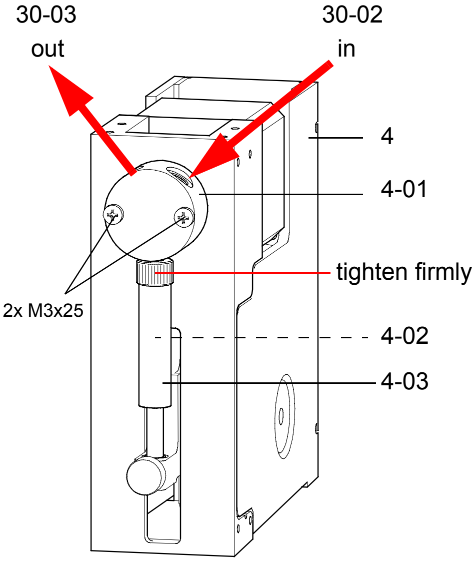
3 Ensure Operating Readiness:

- Tightness check
- FaWa pump test
- Liquid detection test
- Precision test

… as described later in this section.

3-Way Valve, Syringe and Syringe Cap

Exchange of Diluter Spare Parts



4	Diluter XP 3000 or XP 3000 plus
4-01	3-way valve
4-02	Syringe cap (invisible)
4-03	Syringe
30-02	Interconnecting tubing (in)
30-03	Pipetting tubing (out)

Figure 6-35 Removal and installation of diluter spare parts

STOP

Do never replace flat syringe caps by conical ones or vice versa.

After exchange of diluter spare parts Ensure Operating Readiness:

- Tightness check
- FaWa pump test
- Precision test

… as described later in this section.

Dilback-8

Removal

The dilback is positioned in the diluter case behind the diluters.

1 Make sure the instrument is switched off and the mains power connection is disconnected.

2 Remove all diluters (4) from the instrument.

3 Disconnect the cable leading to Optibo/Optibo Power.

4 Remove the dilback fixing screws.

Installation

1 Make sure the instrument is switched off and the mains power connection is disconnected.

2 Install in reverse order.

- Control if jumper J10 has been set correctly according the configuration of the instrument (see 'Communication Overview' in Section 6.2.2, 'Jumper and Address Settings Overview').
- Connect cable from Optibo/Optibo Power to socket J1.

3 Ensure Operating Readiness:

- CAN-bus resistance test
- Precision test

… as described later in this section.

Ensure Operating Readiness

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). *Necessary after replacement of dilback*
2	– Tightness check: fill/flush system and check all tubing connections – FaWa pump test *Necessary after replacement of* • *diluter* • *diluter spare part*
3	Liquid detection test *Necessary after replacement of diluter*
4	Precision test *Necessary after replacement of* • *diluter* • *diluter spare part* • *dilback*

6.4.4 MPO/FWO

WARNING

The liquid system may contain compounds hazardous to your health.
Make sure the complete liquid system has been properly decontaminated before you perform any service tasks on the MPO or FWO.

General

Three MPO/FWO material variants:	*Standard, high resistant type A and type B*
Monitored Pump Option (MPO):	*Fast wash pump with liquid level sensors (LICOS) for RSP and RWS instruments*
Fast Wash Option (FWO):	*Fast wash pump without liquid level sensors for RSP, RWS and RMP* instruments*

**For RMP instruments: LICOS is standard – but controlled via the Supervisor Board (see* Figure 6-26, ‘Cable connections on Supervisor, Uniport and CANDI boards’*.*

The MPO/FWO contains one of the following fast wash pumps:

- Single head pump for instruments with 4 tips (produced until January 1998).
- Double head pump for instruments with 8 tips (produced until January 1998).
- FaWa pump for instruments with 4 or 8 tips (produced as of February 1998 and with serial numbers ≥ 2880).

In case of a defective single head or double head pump, you need to upgrade the instrument with the FaWa pump.

The fast wash pump is installed below the worktable, on the left side behind the worktable cover (Figure 6-39, item 11).

Spare Parts MPO/FWO

For spare parts list with part numbers refer to Section 7.2.3, ‘Spare Parts MPO/FWO’.

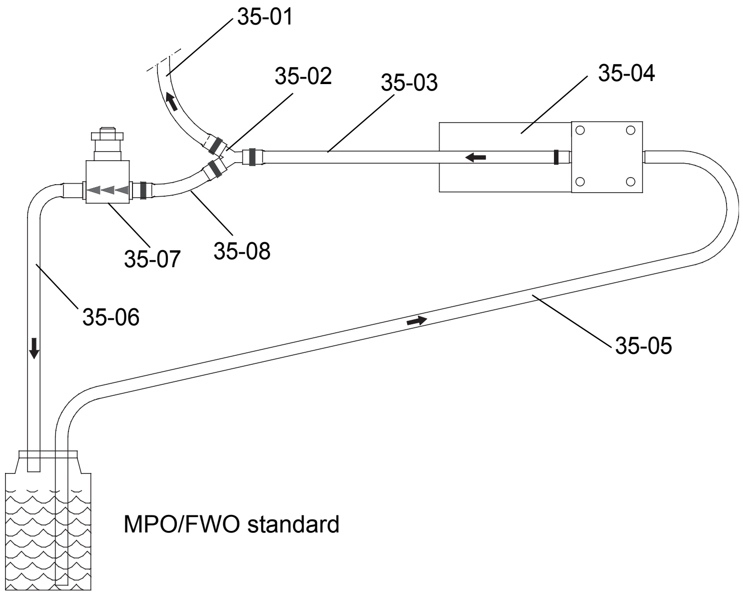
*Pay attention to the fact that part numbers of items may differ according to the installed tubing system (*Standard Material, High Resistant Type A or High Resistant Type B).

Following items can be replaced as spare parts:

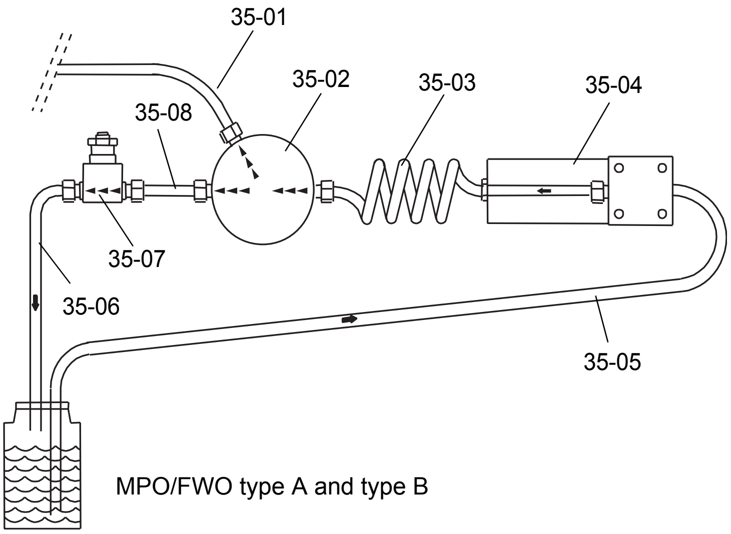
- MPO complete
- FWO complete
- FaWa pump
- Tubing system
  Distributor 1 to 2
  Pressure relief valve
- LICOS complete
  Level tubing
  Sensor

- MPO board
  Connection cable

Overview MPO/FWO for RSP and RWS


35-01
35-02
35-03
35-04
35-07
35-08
35-06
35-05

MPO/FWO standard


35-01
35-02
35-03
35-04
35-08
35-07
35-06
35-05

MPO/FWO type A and type B

Figure 6-36 MPO/FWO tubing connections for RSP and RWS

35-01	Aspiration tubing	35-05	Aspiration tubing to FaWa pump
35-02	Distributor 1 to 2	35-06	Waste tubing for pressure relief valve
35-03	Pressure tubing	35-07	Pressure relief valve
35-04	FaWa pump	35-08	Tubing to pressure relief valve

Overview FWO for RMP

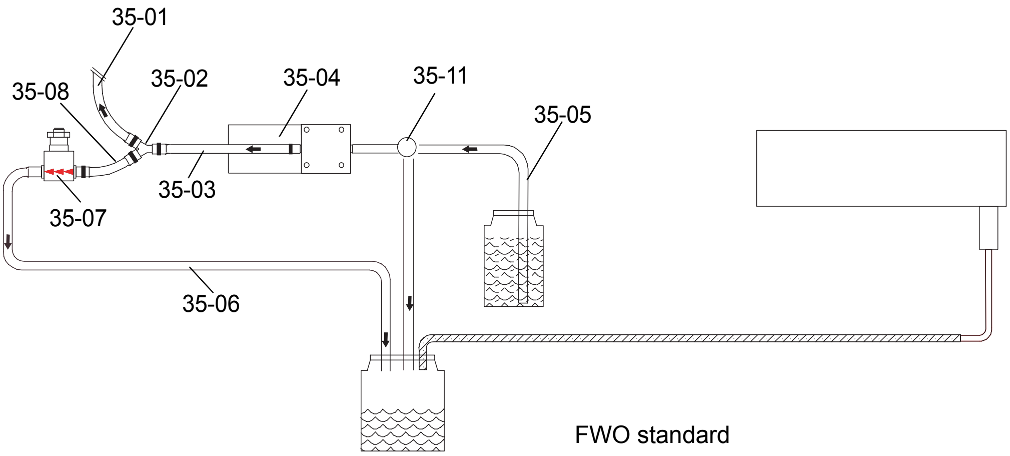
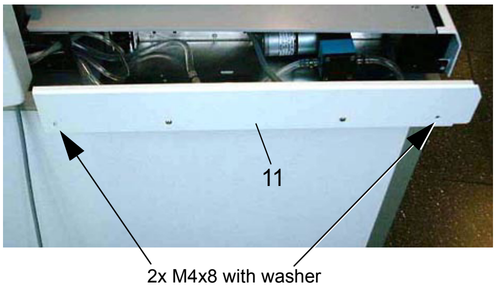


Figure 6-37 FWO tubing connections for RMP

35-01	Aspiration tubing	35-06	Waste tubing for pressure relief valve
35-02	Distributor 1 to 2	35-07	Pressure relief valve
35-03	Pressure tubing	35-08	Tubing to pressure relief valve
35-04	FaWa pump	35-11	Valve
35-05	Aspiration tubing to FaWa pump		

MPO/FWO Complete

Removal of Fast Wash Pump Assembly



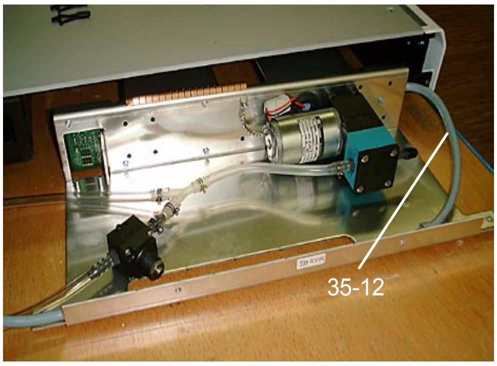


Figure 6-38 Fast wash pump assembly removal

1 Empty the liquid system.

2 Switch off the instrument.

3 Remove the two outer screws of the left worktable cover (11).

4 Pull the fast wash pump assembly out of the instrument like a drawer (refer to Figure 6-38, ‘Fast wash pump assembly removal’).

For older versions it may be necessary to remove the worktable cover (11) completely and to unscrew the fast wash pump assembly from the instrument frame.

5 Disconnect the tubing and the connection cable (35-12).

11	Left worktable cover
35-12	Connection cable

Installation of Fast Wash Pump Assembly

1 Install in reverse order:

- For correct cable connection refer to Figure 6-42, 'Connections to MPO board V2.0' or Figure 6-43, 'Connections to MPO board V3.1/V4.0'.
- Tubing connections: refer to Figure 6-36, 'MPO/FWO tubing connections for RSP and RWS' or Figure 6-37, 'FWO tubing connections for RMP'.

2 Ensure Operating Readiness:

- Tightness check
- FaWa pump test
- LICOS test

… as described later in this section.

FaWa Pump

Removal

1 Remove the fast wash pump assembly from the instrument.

2 Remove the tubing from the FaWa pump (35-04, Figure 6-40).

3 Disconnect the pump cable from MPO board (35-13).

4 Remove the FaWa pump from the fast wash pump assembly (5 screws, refer to figure Figure 6-39, 'Fast wash pump assembly, rear side view').

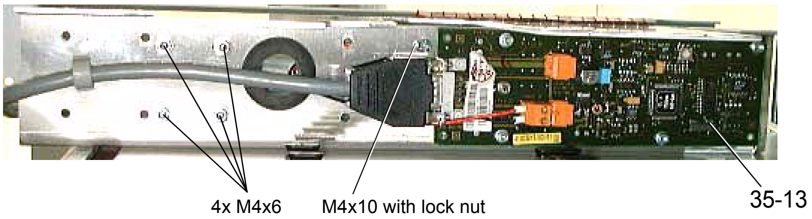


Figure 6-39 Fast wash pump assembly, rear side view

35-13	MPO board

Installation

1 Install in reverse order:

- For correct cable connection refer to Figure 6-42, 'Connections to MPO board V2.0' or Figure 6-43, 'Connections to MPO board V3.1/V4.0'.
- Tubing connections: refer to Figure 6-36, 'MPO/FWO tubing connections for RSP and RWS' or Figure 6-37, 'FWO tubing connections for RMP'.

2 Ensure Operating Readiness:

- Tightness check
- FaWa pump test

… as described later in this section.

Pressure Relief Valve

Removal

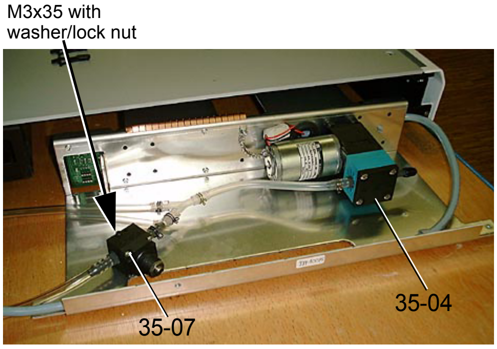


Figure 6-40 Pressure relief valve

1 Remove the fast wash pump assembly from the instrument.

2 Remove the tubing from the pressure relief valve (35-07).

3 Unscrew the pressure relief valve from the fast wash pump assembly.

Make sure not to confuse with the pressure regulating screw. Do not alter the setting of the pressure regulating screw.

35-04	FaWa pump
35-07	Pressure relief valve

Installation

1 Install in reverse order.

2 Ensure Operating Readiness:

- FaWa pump test

… as described later in this section.

MPO/FWO Tubing

Removal

1 Remove the fast wash pump assembly from the instrument.

2 Remove the tubing.

Installation

1 Install in reverse order.

- Tubing connections: refer to Figure 6-36, ‘MPO/FWO tubing connections for RSP and RWS’ or Figure 6-37, ‘FWO tubing connections for RMP’.

The waste tubing for the pressure relief valve (35-06) may be lead into the waste container to prevent contamination of the system liquid with liquid flowing back over the pressure relief valve.

2 Ensure Operating Readiness:

- Tightness check
- FaWa pump test

… as described later in this section.

LICOS Sensors

For RSP/RWS: the LICOS sensors are connected to the MPO board.
For RMP: the Licos sensors are connected to the Supervisor board (refer to Figure 6-26, 'Cable connections on Supervisor, Uniport and CANDI boards').

Removal

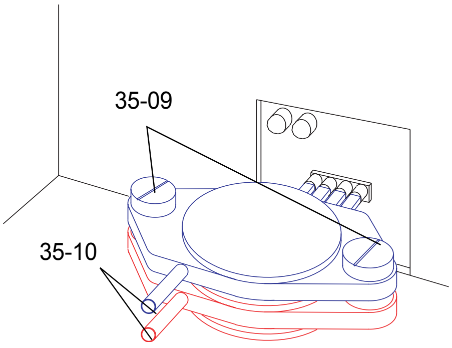


Figure 6-41 LICOS sensors

1. Remove the fast wash pump assembly from the instrument.
2. Remove the tubing (35-10) from the LICOS sensor.
3. Unscrew the LICOS sensor fixing screws and remove the LICOS sensor(s)

35-09	Fixing screws
35-10	LICOS tubing

Installation

1. Install in reverse order:
   - LICOS sensor on position 1: system liquid
   - LICOS sensor on position 2: waste

   Refer to Figure 6-42, 'Connections to MPO board V2.0' or Figure 6-43, 'Connections to MPO board V3.1/V4.0'.
2. Ensure Operating Readiness:
   - FaWa pump test
   - LICOS test

   … as described later in this section.

MPO Board

Removal

1. Remove the fast wash pump assembly from the instrument. The MPO board is located at the backside of the assembly.
2. For MPO: disconnect the LICOS sensors from the MPO board.
3. Disconnect the FaWa pump cable and the connection cable.
4. Unscrew the MPO board.

Installation

1. Install in reverse order:
    - For correct cable connection refer to Figure 6-42, 'Connections to MPO board V2.0' or Figure 6-43, 'Connections to MPO board V3.1/V4.0'.

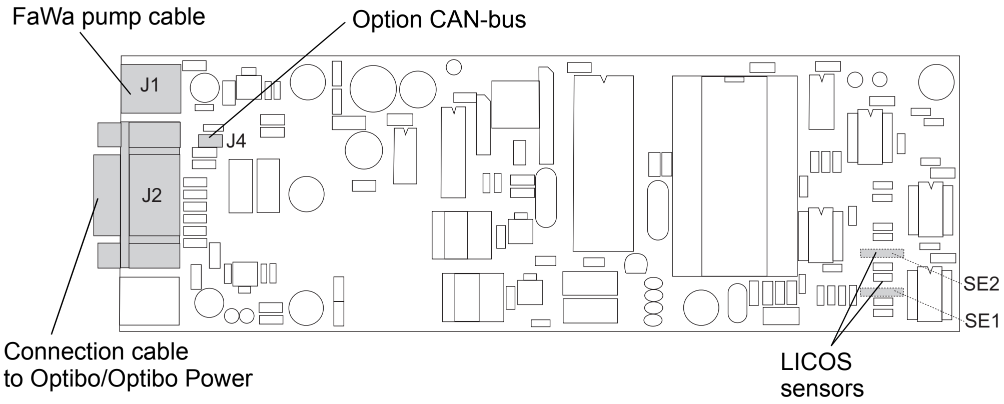

FaWa pump cable
Option CAN-bus
J1
J4
J2
SE2
SE1
Connection cable to Optibo/Optibo Power
LICOS sensors

Figure 6-42 Connections to MPO board V2.0

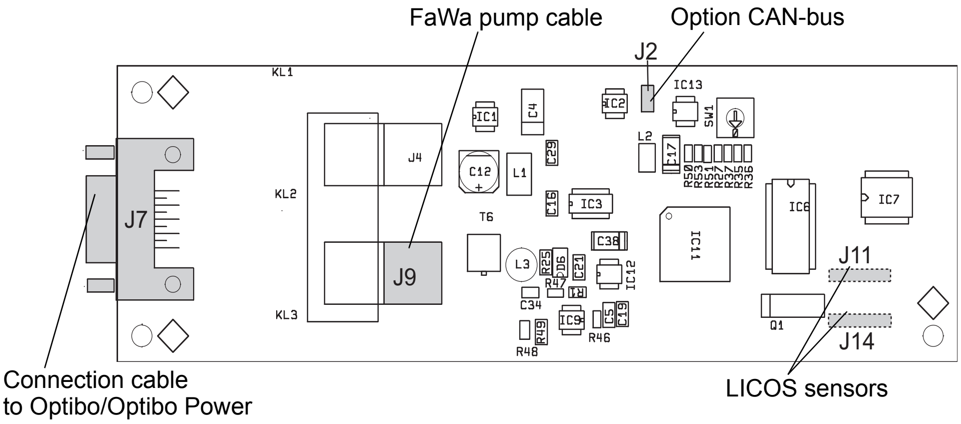

FaWa pump cable
Option CAN-bus
J2
KL1
IC13
SW1
IC2
IC1
C4
L2
J4
C12
L1
C29
KL2
J7
IC3
C16
T6
IC6
IC7
C38
IC11
J11
L3
IC12
J9
KL3
C34
IC9
R46
R48
Q1
J14
Connection cable to Optibo/Optibo Power
LICOS sensors

Figure 6-43 Connections to MPO board V3.1/V4.0

2. Ensure Operating Readiness:
    - CAN-bus resistance test
    - Tightness check
    - FaWa pump test
    - LICOS Test

    … as described later in this section.

Ensure Operating Readiness

Step	**Test or Setup**
1	CAN-bus resistance (see Section 6.2.3). *Necessary after replacement of MPO board*
2	Tightness check: fill/flush system and check all tubing connections *Necessary after replacement of* • *Fast wash pump assembly* • *FaWa pump* • *MPO/FWO tubing* • *LICOS sensor* • *MPO board*
3	FaWa pump test *Necessary after replacement of* • *Fast wash pump assembly* • *FaWa pump* • *Pressure relief valve* • *MPO/FWO tubing* • *LICOS sensor* • *MPO board*
4	LICOS test *Necessary after replacement of* • *FaWa pump assembly* • *LICOS sensor* • *MPO board*

6.4.5 Low Volume Option

The low volume option is available for RSP or RWS instruments. The low volume option 1 – with pinch valve tubing – was supplied until February 2001. The low volume option 2 – with membrane type solenoid valves – is supplied as of October 2000.

Mode of Functioning

The low volume option allows precise and reliable pipetting of low volumes with free dispensing. A droplet is pumped to the tip end by means of the diluter. The solenoid/ pinch valve releases the pulse for cutting off the droplet.

Minimum Requirements

CU firmware version – control unit on instrument	Genesis instrument software version	Application software	
		Gemini software version	Logic software version
V1.30 or later	V3.10 or later	V3.00 or later	V2.20 or later

Spare Parts

For spare parts list with part numbers refer to Section 7.2.4, 'Spare Parts Low Volume Option'.

Following items can be replaced as spare parts:

- Low volume option 1:
  Pinch valve
  Low volume tubing set (FEP/Tygon)
  Pinch valve tubing (DMSO resistant)
  Set of nuts
  Low volume main board
  Fuse (8 AT)
- Low volume option 2:
  Solenoid valve
  Low volume tubing set (FEP)
  Low volume main board
- Fuse (8 AT)
- Low volume wash station complete:
  Wash station low volume (PP)
  Waste tubing
  Fill tubing

Overview

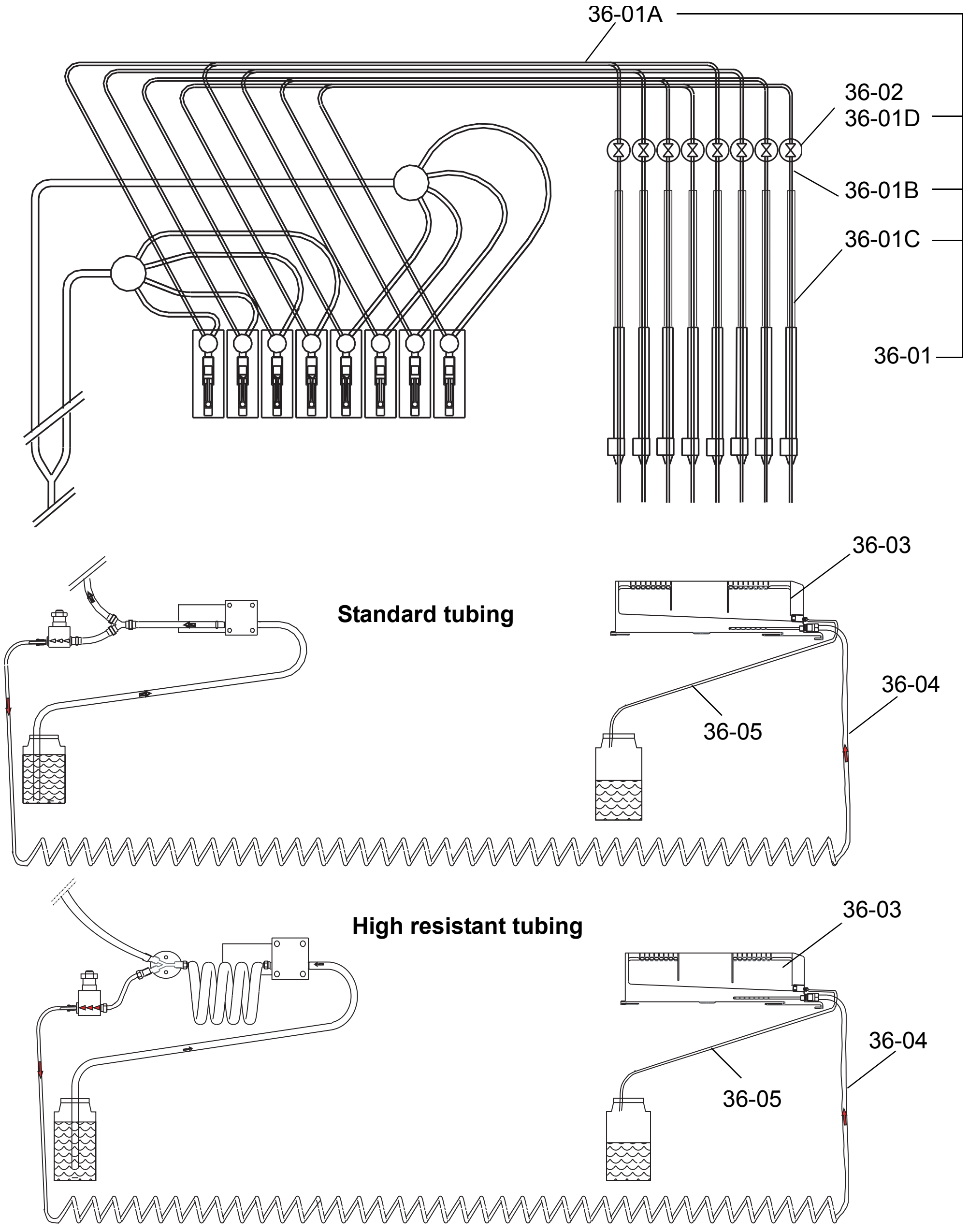

36-01A
36-02
36-01D
36-01B
36-01C
36-01
Standard tubing
36-03
36-04
36-05
High resistant tubing
36-03
36-04
36-05

Figure 6-44 Low volume option – principal components

36-01	Tubing set, containing:
36-01A	Pipetting tubing
36-01B	Pipetting tubing
36-01C	Support tubing
36-01D	Pinch valve tubing (option 1 only)
36-02	Pinch valve (option 1) Solenoid valve (option 2)
36-03	Wash station low volume PP
36-04	Fill tubing
36-05	Waste tubing

Low Volume Option 1

Removal of the Pinch Valve

1 Hold the pinch valve tubing (36-01D) by its nuts (36-08), stretch and pull it off the pinch valve (36-02).

If you have to replace several valves, mark all tubing with their relevant channel number (see Figure 6-65, 'Installing the pipetting tubing').

2 Remove the cover (36-06).

3 Disconnect the respective valve wires from the distribution block (see Figure 6-46).

4 Unscrew and remove the valve (36-02) from the tubing shelf.

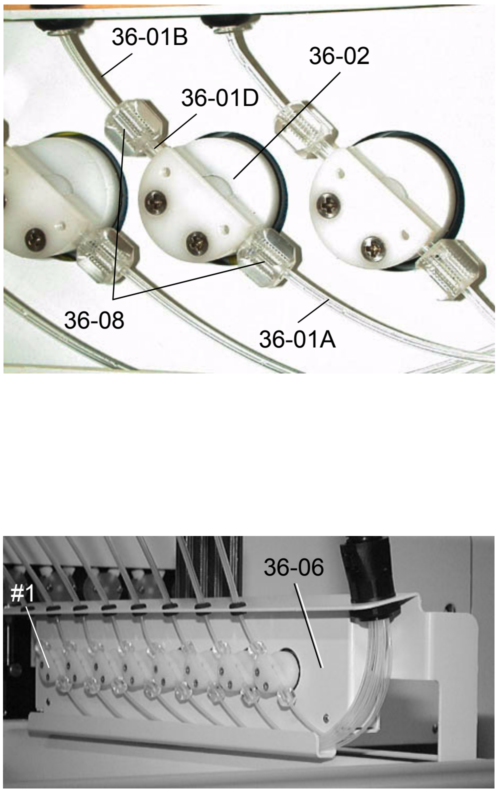


Figure 6-45 Removal of the pinch valve

36-01A	Pipetting tubing A
36-01B	Pipetting tubing B
36-01D	Pinch valve tubing
36-02	Pinch valve
36-06	Cover
36-08	Nut

Installation of the Pinch Valve

1 Install in reverse order.

- Make sure that the pipetting tubing which is connected to diluter #1 (on the far left) and the one which is connected to tip #1 are leading to valve #1 etc.
- For correct wire connection to the distribution block (36-09) refer to Figure 6-46.

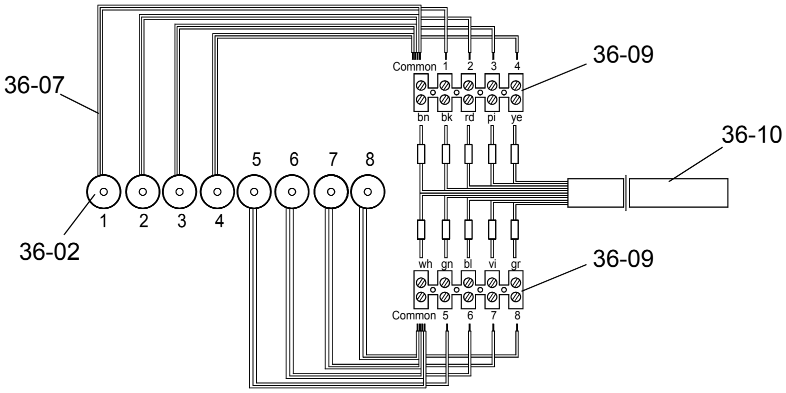


Figure 6-46 Wire connections on distribution block

36-02	Pinch valve	36-09	Distribution block
36-07	Valve wire	36-10	Valve cable to low volume main board

2. Ensure Operating Readiness:
   - Tightness check
   - FaWa pump test
   - Precision test

   … as described later in this section.

Low Volume 1 Tubing System

Find more information on low volume tubing installation in document Doc ID 391 228.

Low Volume Main Board

The procedures for removing and installing of the low volume main board are identical with those for low volume option 2.

1. Follow the instructions given for Low Volume Option 2 later in this section.
2. Ensure Operating Readiness
   - CAN-bus resistance test

   … as described in Section 6.2.3.

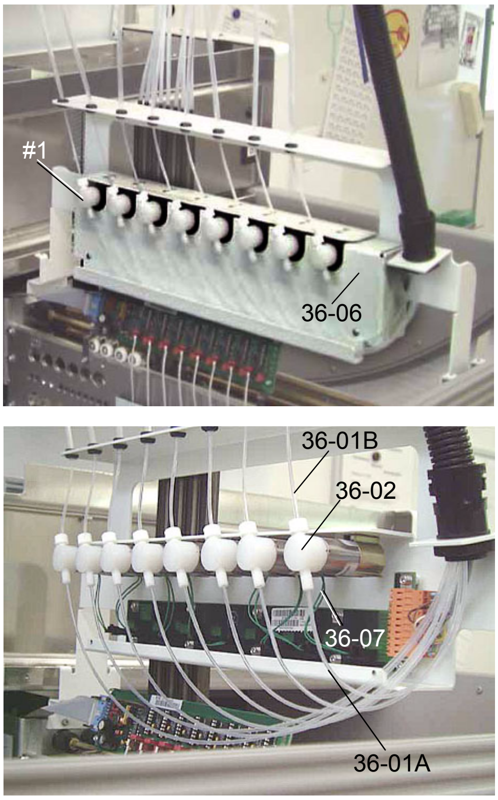
Low Volume Option 2

Removal of the Solenoid Valve

1. Unscrew the pipetting tubing (36-01A, 36-01B) from the valve (36-02).

   If you have to replace several valves, mark all tubing with their relevant channel number (see Figure 6-65, ‘Installing the pipetting tubing’).

2. Remove the cover (36-06).
3. Disconnect the valve wires (36-07) from the low volume distributor board.
4. Pull the valve (36-02) out of its clip bracket.



36-01A	Pipetting tubing A
36-01B	Pipetting tubing B
36-02	Solenoid valve
36-06	Cover
36-07	Valve wire

Figure 6-47 Removal of the solenoid valve

Installation of the Solenoid Valve

1. Install in reverse order.
   - Make sure that the pipetting tubing which is connected to diluter #1 (on the far left) and the one which is connected to tip #1 are leading to valve #1 etc.
2. Ensure Operating Readiness
   - Tightness check
   - FaWa pump test
   - Precision test

   … as described later in this section.

Removal of the Low Volume Main Board

The low volume main board is located in the liquid pan of the instrument.

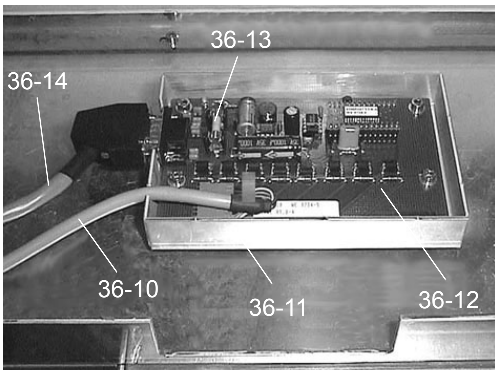


Figure 6-48 Low volume main board

1. Open the top cover (2).
2. Disconnect the cables from the low volume main board (36-12).
3. Unscrew and remove the PCB.

36-10	Valve cable
36-11	PCB box
36-12	Low volume main board
36-13	Fuse 8 AT
36-14	Cable to Optibo/Optibo Power

Installation of the Low Volume Main Board

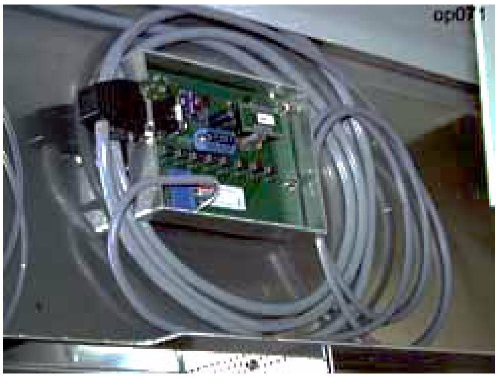


Figure 6-49 Low volume main board

1. Install in reverse order.
   - Do not forget the spacer rings between the PCB and the box (36-11).
   - If the cables (36-10, 36-14) are too long: wind the surplus around the box as illustrated in Figure 6-49.
2. Ensure Operating Readiness
   - CAN-bus resistance test

… as described in Section 6.2.3.

Ensure Operating Readiness

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). *Necessary after replacement of low volume main board*
2	– Tightness check: fill/flush system and check all tubing connections – FaWa pump test – Precision test *Necessary after replacement of* • *pipetting tubing* • *pinch valve tubing* • *pinch valve or solenoid valve*

6.4.6 6-Way Valve Option

The 6-way valve is an option for RSP or RWS instruments. This option is available as type A (FEP/PVDF) or type B (FEP/PP, DMSO resistant).

The MPO/FWO for the 6-way valve option is described in Section 6.4.4, 'MPO/FWO'*.*

Minimum Requirements

6-way valve option	Genesis instrument software version	Gemini application software version
Jan. 2002	V4.2 or later	V3.2 or later

Spare Parts

For spare parts list with part numbers refer to Section 7.2.5, 'Spare Parts 6-Way Valve Option'.

Following items can be replaced as spare parts:

- 6-way valve assembly (valve and board)
- Aspirating tubing/ fittings (set)
- Top tubing complete (set)

Standard Configurations

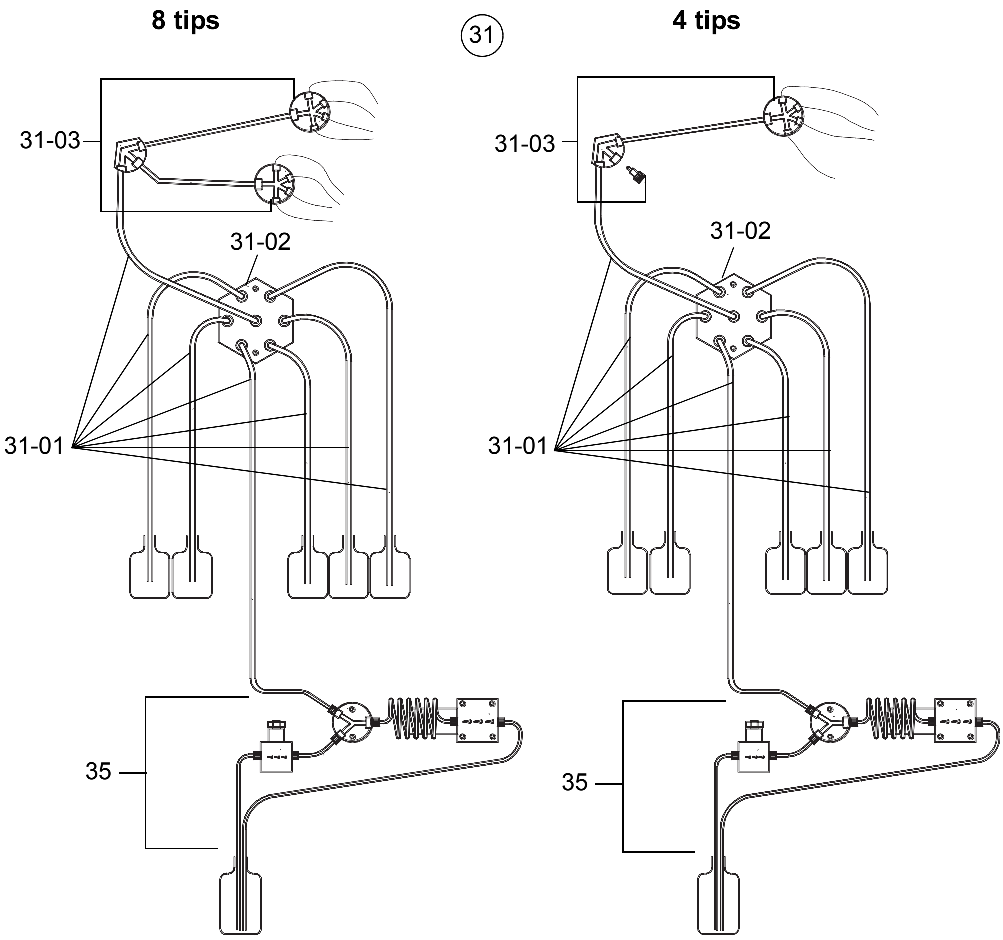


Figure 6-50 Tubing connections for standard configurations

31	6-way valve option	31-03	Top tubing (set)
31-01	Aspiration tubing/fittings (set)	35	MPO/FWO (see Section 6.4.4)
31-02	6-way valve assembly (valve and board)		

6-Way Valve Assembly

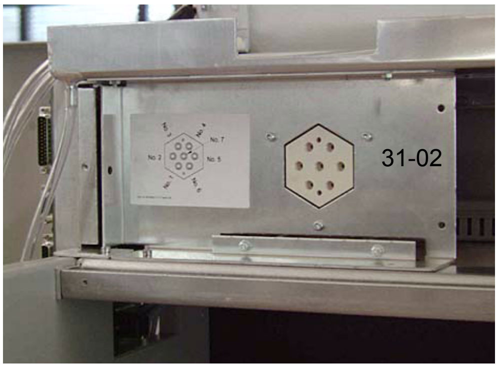


Figure 6-51 Location of the 6-way valve assembly

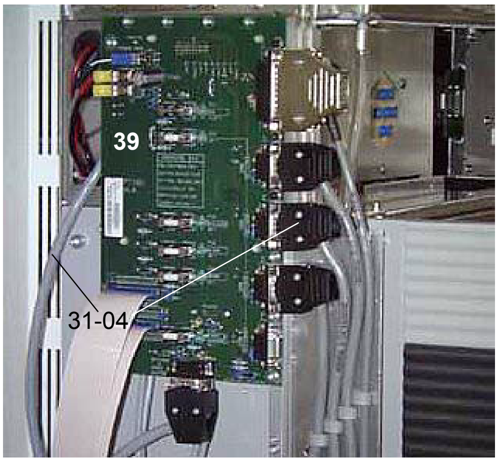
The 6-way valve assembly (31-02) is located on the left side of the front panel and is hidden by the top cover (2).

For repair, the complete 6-way valve assembly (31-02) including the electronic board on the back side has to be shipped to Tecan CH.

Removal

All chemical and biological liquids must be considered to be potentially hazardous agents. Strictly apply appropriate safety precautions according to local, state or federal regulations.

Decontaminate the instrument and assure appropriate safety measures (e.g. wear rubber gloves).



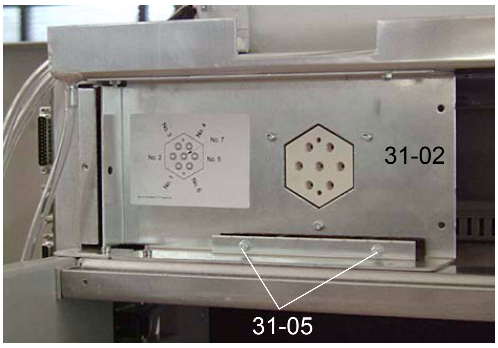
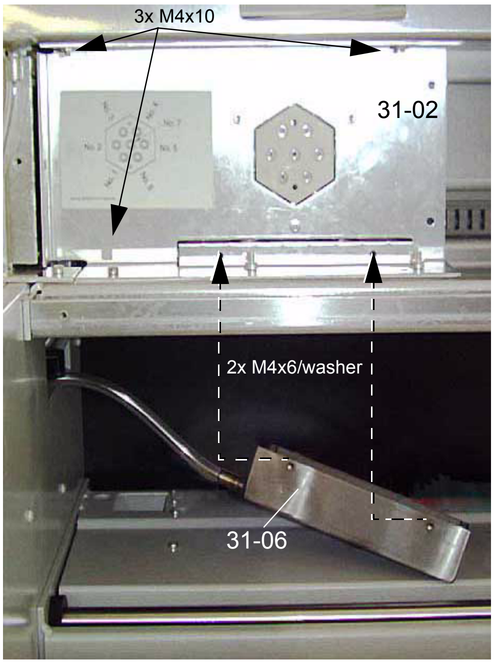


Figure 6-52 Removal of the 6-way valve assembly

1. Empty the liquid system.
   For detailed information refer to the Genesis Instrument Software Manual.
2. Switch off the instrument.
3. Disconnect the respective connection cable (31-04) from the CAN port at the Optibo/Optibo Power (39).
4. Disconnect all tubing from the 6-way valve assembly (31-02).
5. Remove the collecting pan (fixing screws 31-05).
6. Unscrew and remove the 6-way valve assembly from the instrument.

31-02	6-way valve assembly
31-04	Connection cable 6-way valve
31-05	Fixing screws collecting pan
39	Optibo/Optibo Power

Installation

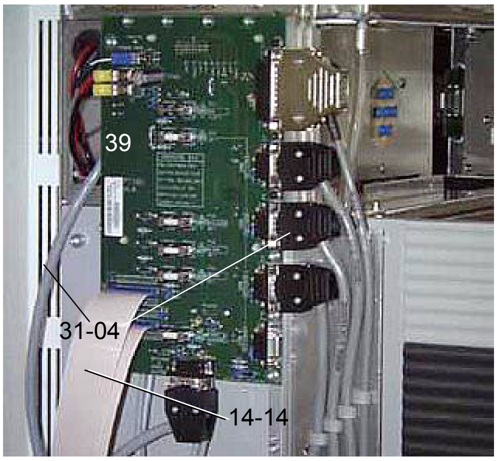


1 Insert the 6-way valve assembly (31-02) into the opening in the front panel and fasten the fixing screws.

2 Screw the collecting pan (31-06) to the 6-way valve assembly.

31-02	6-way valve assembly
31-04	Connection cable
31-06	Collecting pan
14-14	LiHa X-flex cable

Figure 6-53 Installation of the 6-way valve assembly



3 Guide the connection cable (31-04) through the opening in the left side panel and lead it underneath the LiHa X-flex cable (14-14); connect it to a free CAN port on the Optibo/Optibo Power.

4 Attach the tubing to the 6-way valve assembly according to Figure 6-50, ‘Tubing connections for standard configurations’.

5 Ensure operating readiness as described later in this section.

Figure 6-54 Cable connections to Optibo/Optibo Power

Ensure Operating Readiness

After replacing the 6-way valve option or parts of the tubing system, carry out the following tests:

Step	Test or Setup
1	6-way valve switching test
2	Tightness test (6-way valve) *This test can only be performed if a FWO or MPO is installed.*

6.5 LiHa 1 – Disassembly and Assembly Procedures

Supplied until December 1997.

In some other documents, the LiHa 1 might be designated as LiHa.

We recommend not to replace any spare parts at the customer's site but to replace the complete LiHa 1 assembly by a LiHa 2.

The X-DC-Servo board – which controls the X-motor of the LiHa 1 – is described in Section 6.3.5, 'Electronic Boards'*.*

The X-belt as well as the X-motor are described in Section 6.3.3, 'X-Drive Assembly'*.*

ATTENTION

Whenever touching the LiHa 1: observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

6.5.1 Overview

LiHa 1 in Comparison with LiHa 2

Summary of the most obvious differences between LiHa 1 and LiHa 2:

Item	LiHa 1	LiHa 2
Mechanical design	different from LiHa 2	different from LiHa 1
Lower DiTi eject option	not available	available for LiHa 2 with serial numbers ≥ 4000 (as of January 1999)
Low volume option	available for LiHa 1 with serial numbers ≥ 2000	available for all LiHa 2

Spare Parts LiHa 1

For spare parts list with part numbers refer to Section 7.3, 'Spare Parts LiHa 1'.

Following items can be replaced as spare parts:

- Cables:
  X-flex cable
  ILID cable, ILID flat cable
- Electronic boards:
  LiHa backplane
  DC-Servo boards for Y-motor, Y-spreading motor and Z-motors
  ILID board and ILID chip

- Belts:
  Y-belt, Y-spreading belt
- Motors:
  Y-DC-Servo motor, Y-spreading DC-Servo motor
- Tip adapter

We do not recommend to replace the Z-motor at the customer’s site. Please return the complete LiHa 1 assembly to Tecan in case of a defective Z-motor.

Location of Spare Parts

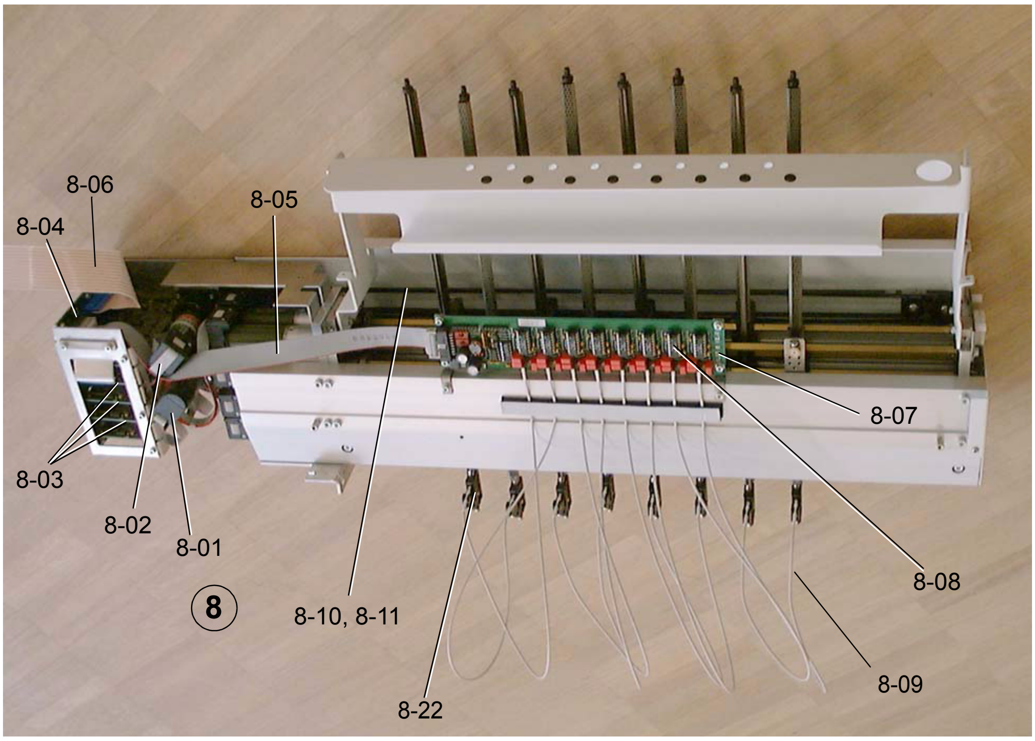


Figure 6-55 LiHa 1 spare parts

8	LiHa 1 assembly	8-06	X-flex cable
8-01	Y-spreading motor	8-07	ILID board
8-02	Y-motor	8-08	ILID chip
8-03	DC-Servo board for Y-motor, Y-spreading motor and Z-motors	8-09	ILID cable
		8-10	Y-belt
8-04	LiHa backplane	8-11	Y-spreading belt
8-05	ILID flat cable	8-22	Tip adapter

6.5.2 Complete LiHa 1 Assembly

Removal

Pipetting tubing and tips might be contaminated. Decontaminate the instrument and assure appropriate safety measures (e.g. wear rubber gloves).

1. Empty the liquid system.
   For detailed information refer to the Genesis Instrument Software Manual.
2. Switch off the instrument. Remove all tips or DiTi adapter cylinders.
3. Remove the pipetting tubing from the Z-rods.

   Recommendation: for easier installation, mark the tubing with the relevant channel number (see LiHa 2, Figure 6-65, 'Installing the pipetting tubing').
4. Unscrew and remove the front cover, the two lateral covers and the tubing shelf.

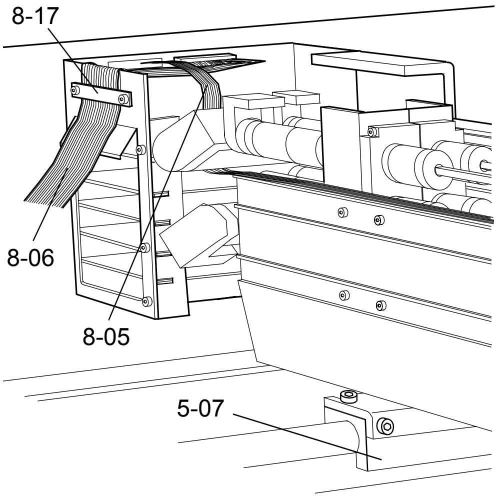


Figure 6-56 LiHa 1 assembly

5. Open the cable fixture (8-17) and disconnect the X-flex cable (8-06) from the LiHa backplane.
6. Unscrew LiHa 1 from X-slide (5-07), lift the LiHa 1 assembly off and place it sidewards onto the worktable – the side with the ILID-cables pointing upward.

8-05	ILID flat cable
8-06	X-flex cable
8-17	Cable fixture
5-07	X-slide

7. If you want to replace the complete LiHa 1 assembly:
   - Disconnect the X-flex cable (8-06) from the Optibo/Optibo Power and remove the cable from the X-bay (5). For details see Section 6.5.3, 'X-Flex Cable'.

Installation

1. Install in reverse order.
   - Clean the contact surface of the guide rail, the guide rollers and the support roller with a lint-free tissue and some ethyl alcohol.
   - To avoid damage to the X-flex cable, make sure it is led under the ILID flat cable (8-05) as shown in Figure 6-56.
2. Ensure Operating Readiness:
   - CAN-bus resistance test
   - Reference positions
   - Random move

- Liquid detection test
- Disposable tips test
- Precision test
- Tightness check

… as described in Section 6.5.10.

6.5.3 X-Flex Cable

The procedures for removing and installing the X-flex cable are identical with those for LiHa 2.

1. Follow the instructions given in Section 6.6.3, 'X-Flex Cable'.
2. Ensure Operating Readiness:
    - Reference positions
    - Random move
    - Liquid detection test

    … as described in Section 6.5.10.

6.5.4 ILID Cable

The procedures for removing and installing the ILID cables are identical with those for LiHa 2.

1. Follow the instructions given in Section 6.6.4, 'ILID Cable'.
2. Ensure Operating Readiness:
    - Liquid detection test

    … as described in Section 6.5.10.

6.5.5 ILID Flat Cable

Removal

Refer to Figure 6-57, 'Installation of ILID flat cable'

1. Remove left cover.
2. Disconnect ILID flat cable (8-05) from the ILID board and the LiHa backplane (8-04).

Installation

1 Install in reverse order.
   - Lead the ILID flat cable (8-05) below the Y-motor (8-02) (see Figure 6-57) to avoid any damages to the cable.

2 Ensure Operating Readiness:
   - Liquid detection test

   … as described in Section 6.5.10.

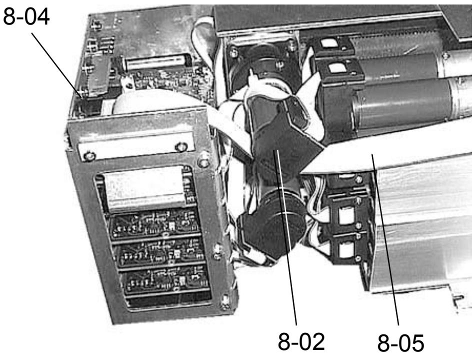


Figure 6-57 Installation of ILID flat cable

8-02	Y-motor
8-04	LiHa backplane
8-05	ILID flat cable

6.5.6 Electronic Boards for LiHa 1

The X-DC-Servo board – which controls the X-motor of the LiHa 1– is described in Section 6.3.5, 'Electronic Boards'.

LiHa Backplane, DC-Servo Boards

The DC-Servo boards which are connected to the LiHa backplane control the Y-motor, the Y-spreading motor and the Z-motors.

Removal

1. Remove LiHa 1 assembly from the instrument. Refer to 6.5.2, 'Complete LiHa 1 Assembly'.
2. Disconnect all cables from LiHa backplane (8-04).

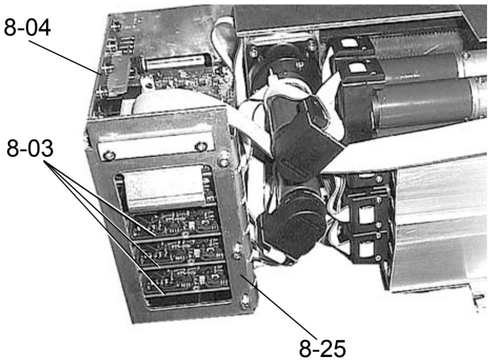


Figure 6-58 LiHa backplane

3. Unscrew and remove the board cage (8-25) with the DC-Servo boards and the LiHa backplane.
4. Remove DC-Servo boards (8-03).
5. Unscrew and remove LiHa backplane.

8-03	DC-Servo boards
8-04	LiHa backplane
8-25	Board cage

Installation

1. Install in reverse order.
   - For correct cable connections and address switch settings on the DC-Servo boards refer to LiHa 2, Figure 6-71, 'LiHa backplane cable connections'.
   - For correct motor allocation refer to LiHa 2, Figure 6-72, 'Motor allocation'.
2. Ensure Operating Readiness:
   - CAN-bus resistance test
   - Liquid detection test
   - and all tests which are necessary after removal of LiHa 1 assembly

   … as described in Section 6.5.10.

ILID Board, ILID Chip

The procedures for removing and installing the ILID board and ILID chips are identical with those for LiHa 2.

1. Follow the instructions given in Section 6.6.6, 'Electronic Boards for LiHa 2'.
2. Ensure Operating Readiness:
   - CAN-bus resistance test
   - Liquid detection test

   … as described in Section 6.5.10.

6.5.7 Y-Belt and Y-Spreading Belt

Inner belt: for Y-axis

Outer belt: for Y-spreading axis

Removal

1 Remove LiHa 1 assembly from the instrument (see Section 6.5.2, ‘Complete LiHa 1 Assembly’).

2 Loosen the tensioning screws (8-29) to slacken both belts.

3 Open the respective belt lock (8-28) and remove the Y-belt (8-10) or Y-spreading belt.

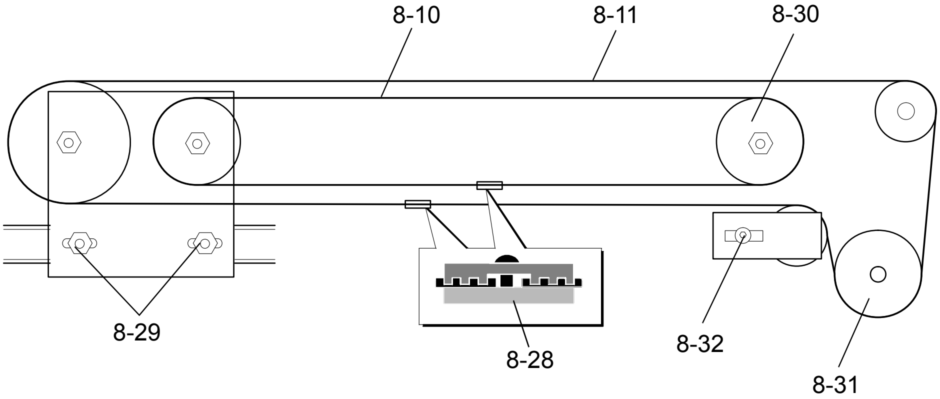


Figure 6-59 Belt removal, view from the right side of the LiHa 1

8-10	Y-belt	8-30	Pulley for Y-motor
8-11	Y-spreading belt	8-31	Pulley for Y-spreading motor
8-28	Belt lock	8-32	Tensioning screw
8-29	Tensioning screws		

Installation

1 Install in reverse order:

- Belt length: cut the new belt to required size according to the replaced one.
- Lead the belt according to Figure 6-59 over the pulleys.
- Tension the belts by means of tensioning screws (8-29) and (8-32).

2 Ensure Operating Readiness:

- Reference positions
- Random move
- and all tests which are necessary after removal of LiHa 1 assembly

… as described in Section 6.5.10.

6.5.8 Y-Motor and Y-Spreading Motor

Removal

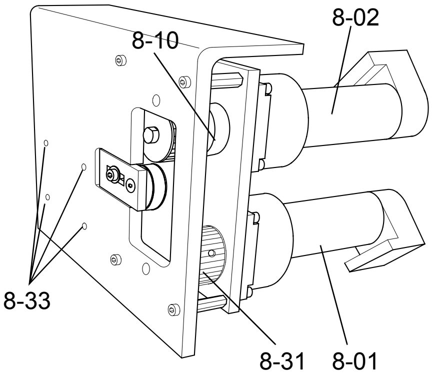
1 Remove LiHa 1 assembly from the instrument (see Section 6.5.2, 'Complete LiHa 1 Assembly').

2 Unscrew and remove the board cage with DC-Servo boards and LiHa backplane (details see Section 6.5.6, 'Electronic Boards for LiHa 1').

3 Remove Y-belt (8-10) and Y-spreading belt (8-11) (details see Section 6.5.7, 'Y-Belt and Y-Spreading Belt').

4 Remove the motor bracket fixing screws (8-34).

5 Disconnect the relevant motor cable from LiHa backplane.



6 Remove pulley from relevant motor.

7 Unscrew and remove the relevant motor (8-01 or 8-02).

8-01	Y-spreading motor
8-02	Y-motor
8-10	Y-belt
8-31	Pulley for Y-spreading motor
8-33	Motor bracket fixing screws

Figure 6-60 Removal of Y-motor and Y-spreading motor

Installation

1 Install in reverse order.
   - When installing the pulley, make sure the set screw is perpendicular to the flat section of the axle. Adjust pulley position according to the other pulleys in this motor assembly: all pulleys must be in the same plane.
   - Make sure the encoder head points in the correct direction as shown in Figure 6-60.
   - For correct motor cable connection refer to LiHa 2, Figure 6-71, 'LiHa backplane cable connections'.
   - Tension the belts (8-10 or 8-11) as described in Section 6.5.7, 'Y-Belt and Y-Spreading Belt'.

2 Ensure Operating Readiness:
   - all tests which are necessary after removal of LiHa 1 assembly

   as described in Section 6.5.10.

6.5.9 Tip Adapter

The procedures for removing and installing the tip adapter are identical with those for LiHa 2.

1. Follow the instructions given in Section 6.6.9, 'Tip Adapter'.
2. Ensure Operating Readiness:
    - Liquid detection test
    - Disposable tips test
    - Precision test
    - Tightness check

    … as described in Section 6.5.10.

6.5.10 Ensure Operating Readiness

Required Special Tools

- Reference tip

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing parts of the LiHa 1, verify – and if necessary carry out – the following settings and tests:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). *Necessary after replacement of* • *LiHa 1 assembly* • *any PCB*
2	– LiHa reference positions – Random move *Attention: never perform a random move test with a Genesis RMP!* *Necessary after replacement of* • *LiHa 1 assembly* • *any LiHa 1 belt* • *X-flex cable*
3	Liquid detection test *Necessary after replacement of* • *LiHa 1 assembly* • *X-flex cable* • *ILID cable, flat cable, chip or board* • *LiHa backplane* • *Tip adapter*

4	– Disposable tips test – Precision test *Necessary after replacement of* • *LiHa 1 assembly* • *tip adapter*
5	– Tightness check: fill/flush system and check all tubing connections *Necessary after replacement of* • *LiHa 1 assembly* • *Tip adapter*

6.6 LiHa 2 – Disassembly and Assembly Procedures

Supplied as of January 1998

The X-DC-Servo board – which controls the X-motor of the LiHa 2 – is described in Section 6.3.5, 'Electronic Boards'.

The X-belt as well as the X-motor are described in Section 6.3.3, 'X-Drive Assembly'.

ATTENTION

Whenever touching the LiHa 2: observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

6.6.1 Overview

LiHa 1 in Comparison with LiHa 2

Summary of the most obvious differences between LiHa 1 and LiHa 2:

Item	LiHa 1	LiHa 2
Mechanical design	different from LiHa 2	different from LiHa 1
Lower DiTi eject option	not available	available for LiHa 2 with serial numbers ≥ 4000 (as of January 1999)
Low volume option	available for LiHa 1 with serial numbers ≥ 2000	available for all LiHa 2

Spare Parts LiHa 2

For spare parts list with part numbers refer to Section 7.4, 'Spare Parts LiHa 2'.

Following items can be replaced as spare parts:

- LiHa 2 assembly
- Cables:
  X-flex cable
  ILID cable, ILID flat cable
- Electronic Boards:
  LiHa backplane
  DC-Servo boards for Y-motor, Y-spreading motor, Z-motors and lower DiTi eject option
  ILID board and ILID chip
- Belts:
  Y-belt, Y-spreading belt
- Motors:
  Y-DC-Servo motor, Y-spreading DC-Servo motor
- Tip adapter
- Lower DiTi eject option 2 (4/8 tips)
  Solenoid
  Upgrade kit (rocker stop and leaf spring)

We do not recommend to replace the Z-motor at the customer's site. Please return the complete LiHa 2 assembly to Tecan in case of a defective Z-motor.

Location of Spare Parts

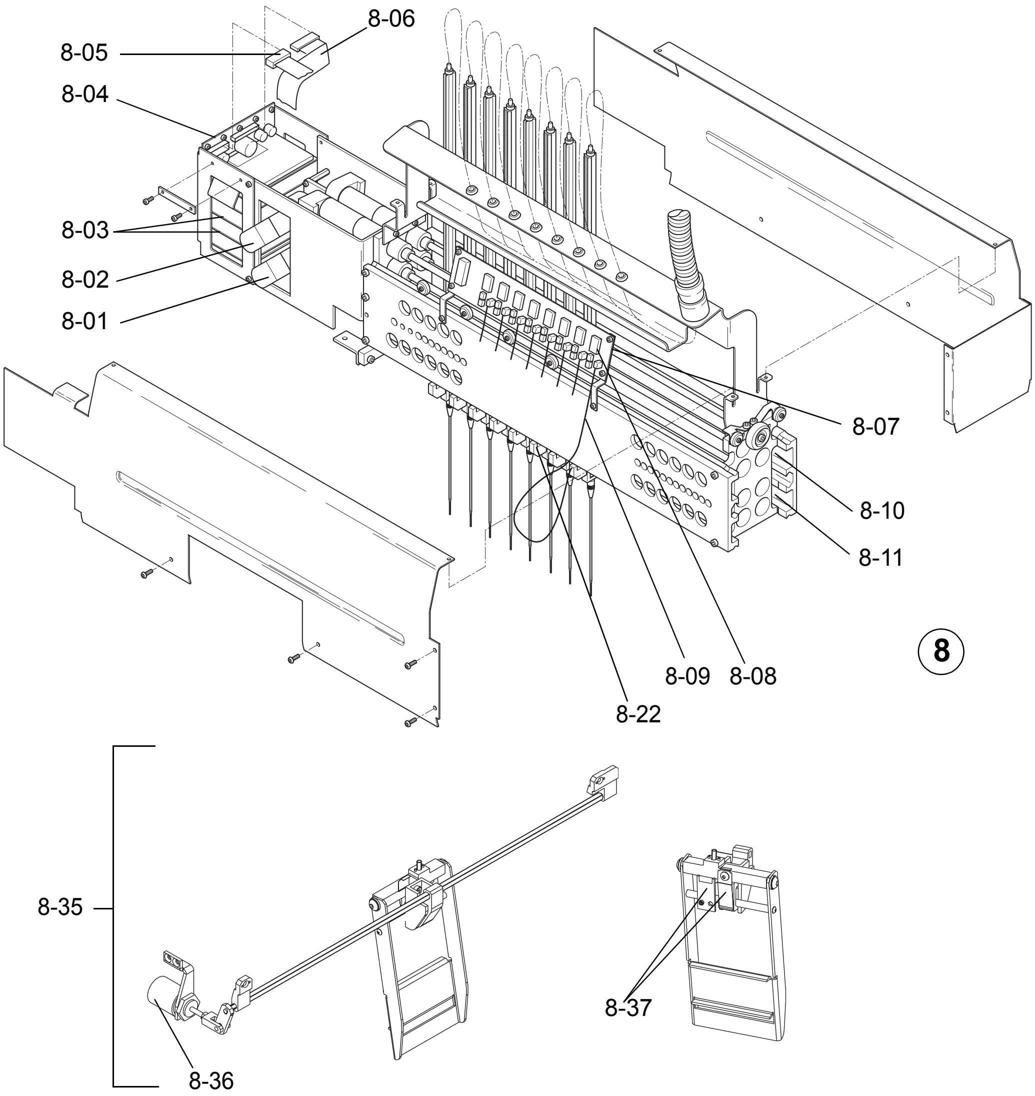


Figure 6-61 LiHa 2 spare parts

8	LiHa 2 assembly	8-08	ILID chip
8-01	Y-spreading motor	8-09	ILID cable
8-02	Y-motor	8-10	Y-belt
8-03	DC-Servo board for Y-motor, Y-spreading motor and Z-motors	8-11	Y-spreading belt
8-04	LiHa backplane	8-22	Tip adapter
8-05	ILID flat cable	8-35	Lower DiTi eject option 2
8-06	X-flex cable	8-36	Solenoid
8-07	ILID board	8-37	Upgrade kit (rocker stop, leaf spring)

6.6.2 Complete LiHa 2 Assembly

Removal

Refer to Figure 6-63, 'LiHa 2 assembly'

Pipetting tubing and tips might be contaminated. Decontaminate the instrument and assure appropriate safety measures (e.g. wear rubber gloves).

1 Empty the liquid system.
For detailed information refer to the Genesis Instrument Software Manual.

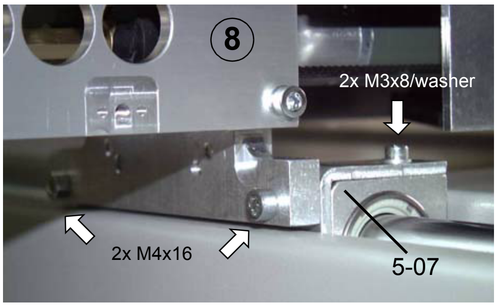
2 Switch off the instrument.Remove all tips (9) or DiTi adapter cylinders.

3 Remove the pipetting tubing (30-03) from the Z-rods (8-13).

Recommendation: for easier installation, mark tubing with the relevant channel number (see Figure 6-65, 'Installing the pipetting tubing').

4 Remove all covers (8-15, 8-16) and the tubing shelf (8-12).

5 Unscrew LiHa 2 from X-slide (5-07), lift the LiHa 2 assembly off and place it sidewards onto the worktable – the side with the ILID-cables (8-09) pointing upward.



8	LiHa 2
5-07	X-slide

Figure 6-62 LiHa 2 X-slide

6 If you want to replace the complete LiHa 2 assembly:

- Disconnect the X-flex cable (8-06) from the Optibo/Optibo Power and remove the cable from the X-bay (5). For details see Section 6.6.3, 'X-Flex Cable'.

If you want to replace spare parts of the LiHa 2:

- Open the cable fixture (8-17) and disconnect the X-flex cable (8-06) from the LiHa backplane (8-04).

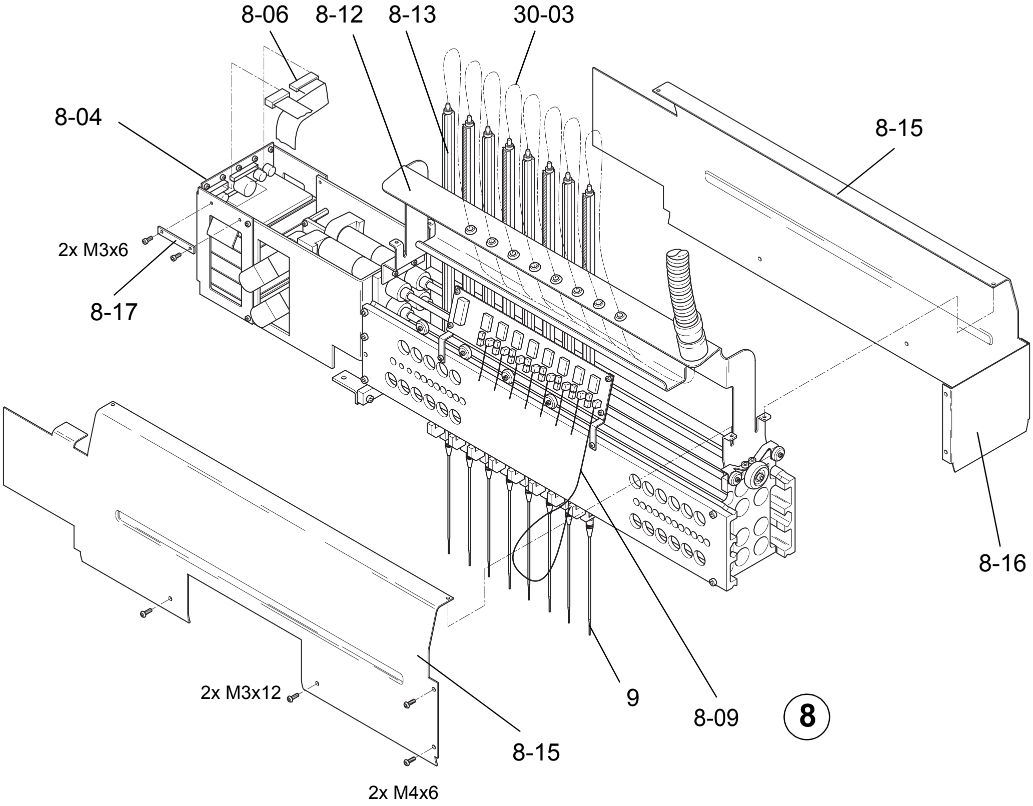

8-06
8-12
8-13
30-03
8-04
8-15
2x M3x6
8-17
8-16
9
8-09
8
2x M3x12
8-15
2x M4x6

Figure 6-63 LiHa 2 assembly

8	LiHa 2 assembly	8-15	Lateral cover
8-04	LiHa backplane	8-16	Front cover
8-06	X-flex cable	8-17	Cable fixture
8-09	ILID cable		
8-12	Tubing shelf	9	Tip
8-13	Z-rod	30-03	Pipetting tubing

Installation

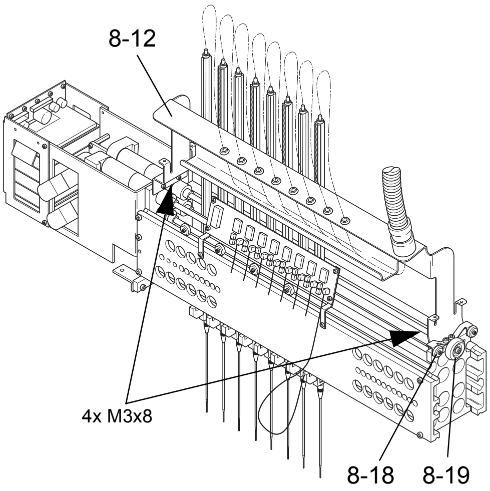

8-12
4x M3x8
8-18
8-19

Figure 6-64 Installing the LiHa 2

1. Install the X-flex cable as described in 6.6.3, ‘X-Flex Cable’.
2. Clean the contact surface of the guide rail, the guide rollers (8-18) and the support roller (8-19) with a lint-free tissue and some ethyl alcohol.
3. Insert LiHa 2 assembly into the guide rail and fix it to the X-slide (5-07).
4. Fix the tubing shelf (8-12) to the LiHa 2.

8-12	Tubing shelf
8-18	Guide rollers
8-19	Support roller

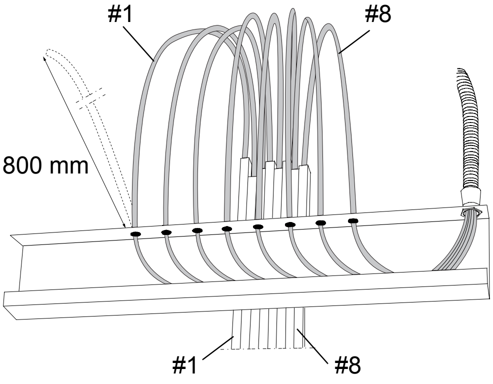


Figure 6-65 Installing the pipetting tubing

5 Install front and lateral covers (8-16, 8-15).

6 Insert the pipetting tubing (30-03) into the Z-rods (8-13).

Make sure that the pipetting tubing connected to diluter #1 (on the far left) is connected to tip #1. Repeat for #2 to #8.

7 Adjust all pipetting tubing length to 800 mm.
Do not cut the remaining tubing, but pull it back and place it in the liquid pan of the instrument.

8 Ensure Operating Readiness:

- CAN-bus resistance test
- Reference positions
- Random move
- Liquid detection test
- Calibrate lower DiTi eject
- Disposable tips test
- Tightness check
- Precision test

… as described in Section 6.6.11.

6.6.3 X-Flex Cable

Refer to Figure 6-63, ‘LiHa 2 assembly’

Removal

1 Remove left cover (8-15).

2 Open the cable fixture (8-17) and disconnect the X-flex cable from the LiHa backplane (8-04).

3 Disconnect the X-flex cable (8-06) from the Optibo/Optibo Power (refer to Figure 6-20, ‘Optibo cable connections’).

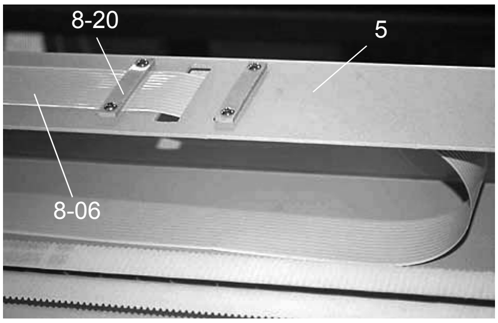


Figure 6-66 X-flex cable

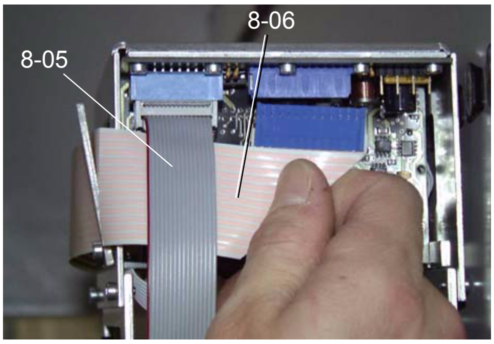
4 Unscrew the cable clamp (8-20) in the X-bay and remove X-flex cable by pulling it carefully through the openings the below the Optibo/Optibo Power and the in the X-bay (5).

5	X-bay
8-06	X-flex cable
8-20	Cable clamp

Installation

1 Install in reverse order.

- Normally, the replacement X-flex cable (8-06) is not folded when it is shipped. Fold the new cable according to the cable you have removed.



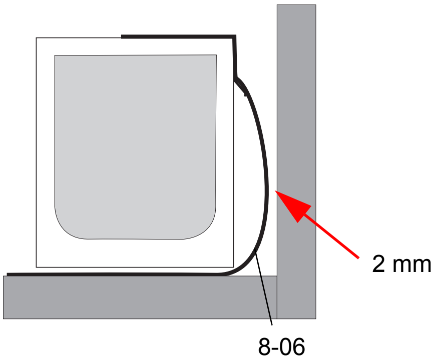


Figure 6-67 Installation of X-flex cable

- To avoid damage to the X-flex cable, lead it under the ILID flat cable (8-05).
- For correct connection to the Optibo/Optibo Power see Figure 6-20, ‘Optibo cable connections’.
- Make sure there is a gap of approx. 2 mm between X-flex cable and the frame of the instrument when the LiHa is moved to the very left side.

8-05	ILID flat cable
8-06	X-flex cable

2 Ensure Operating Readiness:

- Reference positions
- Random move
- Liquid detection test

… as described in Section 6.6.11.

3 Ensure Operating Readiness:
   - Reference positions
   - Random move
   - Liquid detection test

   … as described in Section 6.6.11.

6.6.4 ILID Cable

Removal

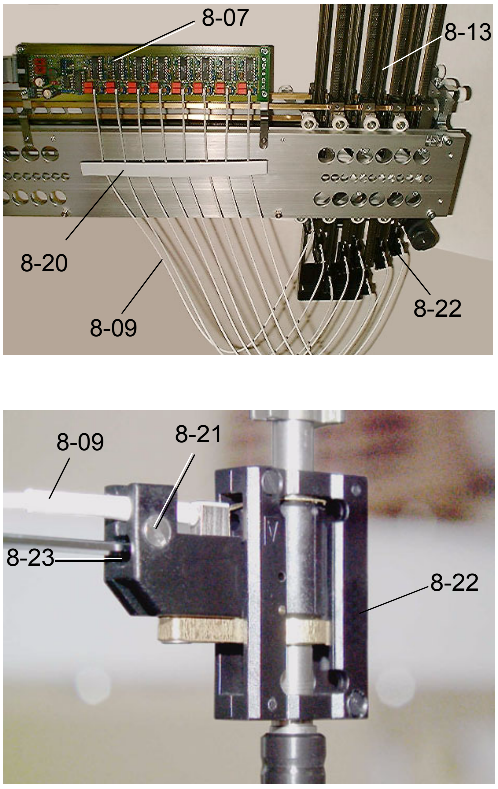


Figure 6-68 Removal of ILID cable

1. Remove left cover (8-15).
2. Remove Velcro tape (8-20).

8-07	ILID board
8-09	ILID cable
8-13	Z-rod
8-20	Velcro tape
8-21	Fixing screw
8-22	Tip adapter
8-23	Set screw

3. Loosen fixing screw (8-21) and set screw (8-23); disconnect ILID cable (8-09) from tip adapter.
4. Disconnect ILID cable (8-09) from ILID board (8-07).

Installation

1. Install in reverse order.
2. Ensure Operating Readiness:
   - Liquid detection test
   - Calibrate lower DiTi eject
   - Disposable tips test
   - Tightness check
   - Precision test

   … as described in Section 6.6.11.

6.6.5 ILID Flat Cable

Removal

Refer to Figure 6-69, 'Installation of ILID flat cable'

1. Remove left cover (8-15).
2. Disconnect ILID flat cable (8-05) from the ILID board (8-07) and the LiHa backplane (8-04).

Installation

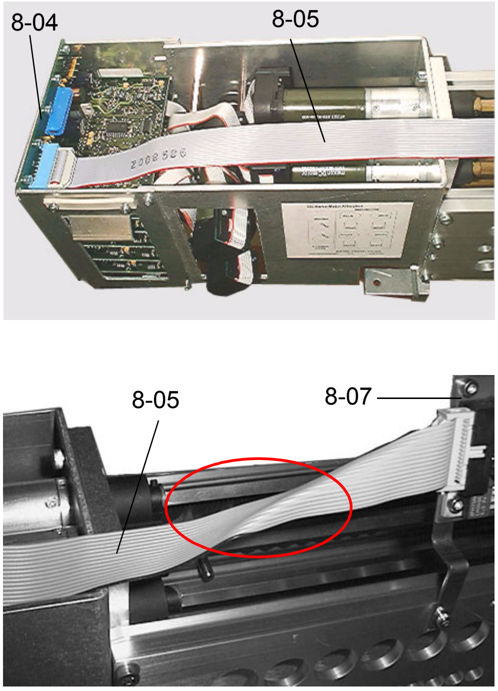


Figure 6-69 Installation of ILID flat cable

1. Install in reverse order.
   - When replacing the ILID flat cable, fold it according to Figure 6-69 to avoid any damages to the cable.
2. Ensure Operating Readiness:
   - Liquid detection test

… as described in Section 6.6.11

8-04	LiHa backplane
8-05	ILID flat cable
8-07	ILID board

6.6.6 Electronic Boards for LiHa 2

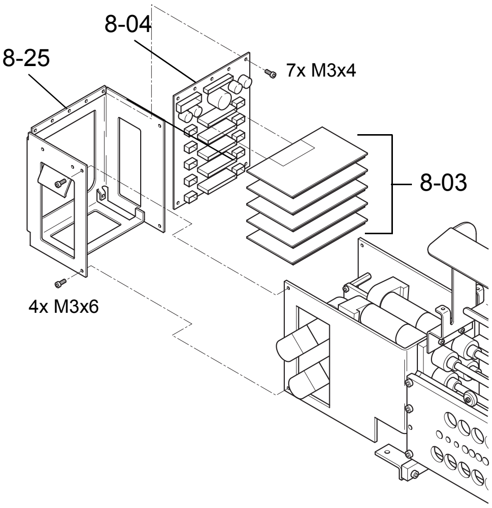
The X-DC-Servo board – which controls the X-motor of the LiHa 2 – is described in Section 6.3.5, ‘Electronic Boards’.

LiHa Backplane, DC-Servo Boards

The DC-Servo boards which are connected to the LiHa backplane control the Y-motor, the Y-spreading motor, the Z-motors and the lower DiTi eject option.

Removal

1. Remove LiHa 2 assembly from the instrument. Refer to 6.6.2, ‘Complete LiHa 2 Assembly’.
2. Disconnect all cables from LiHa backplane (8-04).
3. Unscrew and remove the board cage (8-25) with the DC-Servo boards and the LiHa backplane.
4. Remove DC-Servo boards (8-03).
5. Unscrew and remove LiHa backplane.



8-03	DC-Servo boards
8-04	LiHa backplane
8-25	Board cage

Figure 6-70 LiHa backplane

Installation

1. Install in reverse order.
   - For correct cable connections and address switch settings on the DC-Servo boards refer to Figure 6-71.
   - For correct motor allocation refer to Figure 6-72.
2. Ensure Operating Readiness:
   - CAN-bus resistance test
   - Liquid detection test
   - and all tests which are necessary after removal of LiHa 2 assembly

… as described in Section 6.6.11

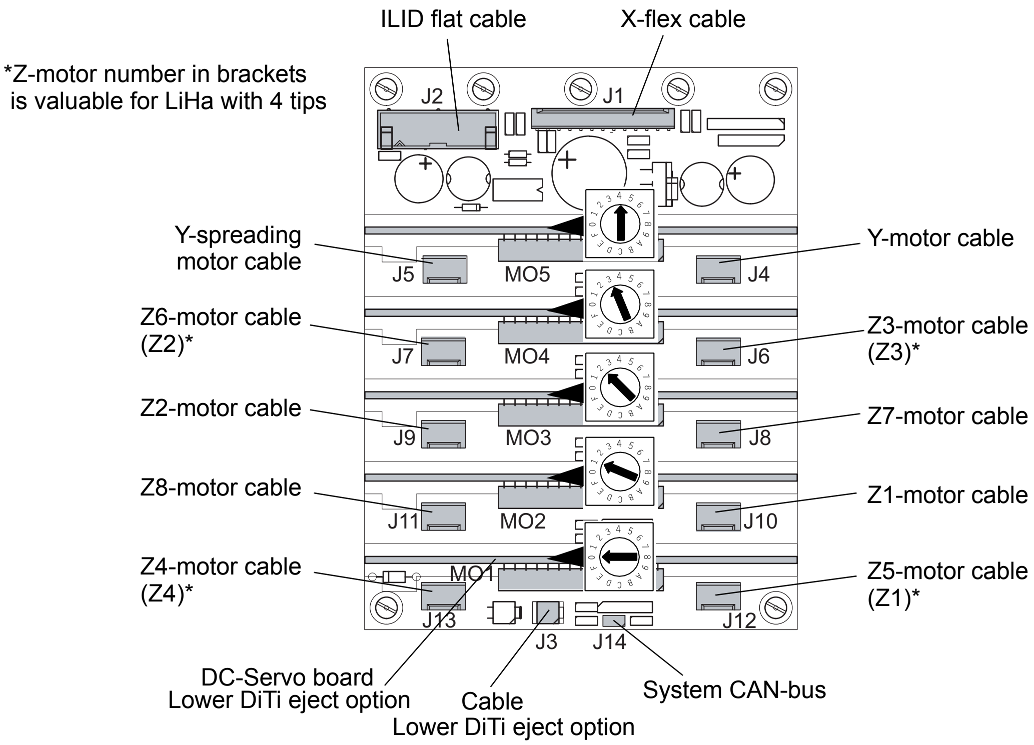

ILID flat cable
X-flex cable
*Z-motor number in brackets
is valuable for LiHa with 4 tips
J2
J1
Y-spreading
motor cable
J5
MO5
J4
Y-motor cable
Z6-motor cable
(Z2)*
J7
MO4
J6
Z3-motor cable
(Z3)*
Z2-motor cable
J9
MO3
J8
Z7-motor cable
Z8-motor cable
J11
MO2
J10
Z1-motor cable
Z4-motor cable
(Z4)*
MO1
J13
J3
J14
J12
Z5-motor cable
(Z1)*
DC-Servo board
Lower DiTi eject option
Cable
Lower DiTi eject option
System CAN-bus

Figure 6-71 LiHa backplane cable connections

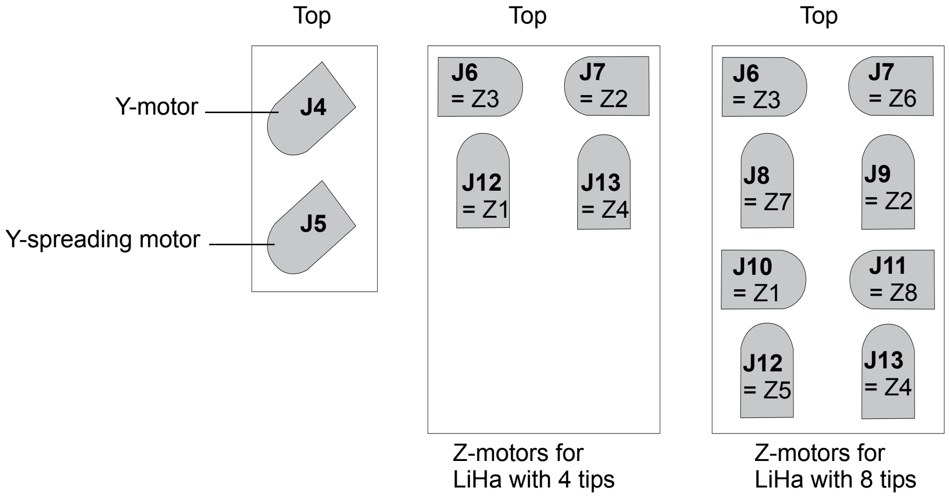
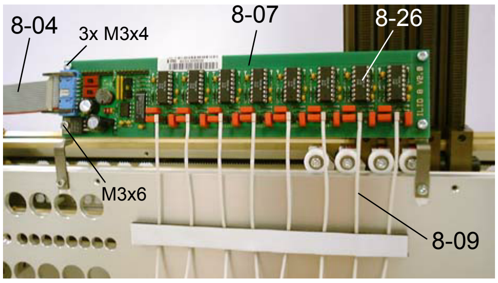

Top
Top
Top
Y-motor
J4
Y-spreading motor
J5
J6
= Z3
J7
= Z2
J12
= Z1
J13
= Z4
J6
= Z3
J7
= Z6
J8
= Z7
J9
= Z2
J10
= Z1
J11
= Z8
J12
= Z5
J13
= Z4
Z-motors for
LiHa with 4 tips
Z-motors for
LiHa with 8 tips

Figure 6-72 Motor allocation

ILID Board

Removal

1. Remove left cover.
2. Disconnect the ILID flat cable (8-04) and all ILID cables (8-09) from ILID board (8-07).
3. Unscrew and remove ILID board.


8-04
3x M3x4
8-07
8-26
M3x6
8-09

8-04	ILID flat cable
8-07	ILID board
8-09	ILID cable
8-26	ILID chip

Figure 6-73 Removal of ILID board

Installation

1. Install in reverse order.
    - Make sure the two ILID board switches are set according to the number of tips (see Figure 6-74).

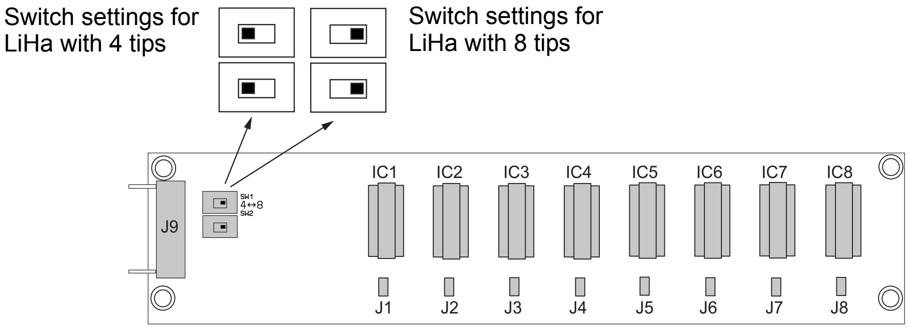

Switch settings for
LiHa with 4 tips
Switch settings for
LiHa with 8 tips
J9
SW1
4↔8
SW2
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
J1
J2
J3
J4
J5
J6
J7
J8

Figure 6-74 ILID board

2. Ensure Operating Readiness:
    - CAN-bus resistance test
    - Liquid detection test

    … as described in Section 6.6.11

ILID Chip

Removal

1 Remove left cover.

2 Remove ILID chip with an appropriate tool.

Installation

1 Install in reverse order.

2 Ensure Operating Readiness:

- Liquid detection test

… as described in Section 6.6.11.

6.6.7 Y-Belt and Y-Spreading Belt

Upper belt: for Y-axis

Lower belt: for Y-spreading axis

Removal

1 Remove LiHa 2 assembly from the instrument (see Section 6.6.2, 'Complete LiHa 2 Assembly').

2 Unscrew and remove the board cage (8-25) with DC-Servo boards and LiHa backplane (details see Section 6.6.6, 'Electronic Boards for LiHa 2').

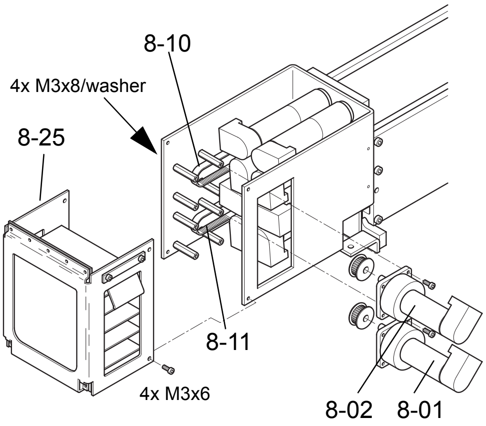


Figure 6-75 Removal of Y-belt

3 Unscrew and remove the relevant motor assembly (8-01 or 8-02) to slacken the belt.

8-01	Y-spreading motor
8-02	Y-motor
8-10	Y-belt
8-11	Y-spreading belt
8-25	Board cage

4 Refer to Figure 6-76, 'Belt lock removal':

- Remove the respective belt lock (8-28) from the Y-slide (8-27) and take the Y-belt (8-10) or Y-spreading belt (8-11) out of the LiHa 2.
- Open the belt lock (8-28).

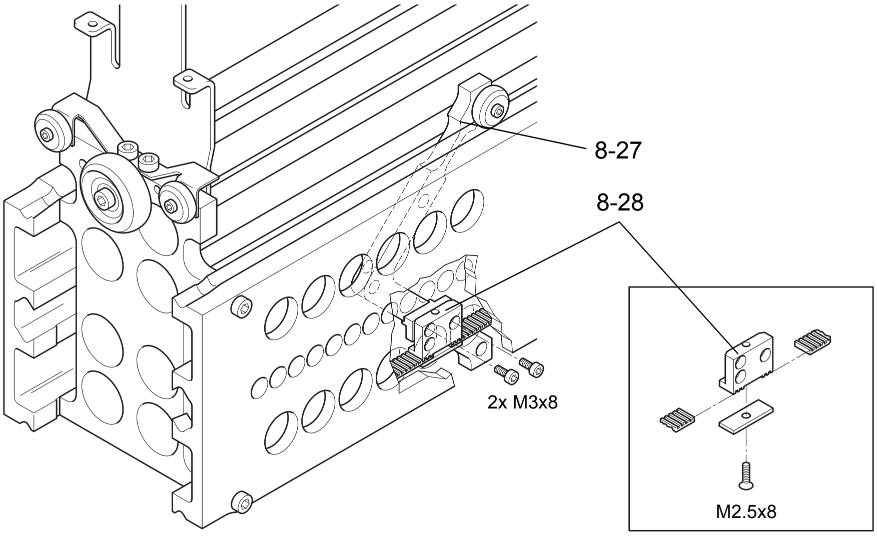


Figure 6-76 Belt lock removal

8-27	Y-slide
8-28	Belt lock

Installation

1 Install in reverse order:

- Belt length: 1290 mm/50.8 inch.
- For LiHa 2 with 4 tips: fix belt lock to Y-slide #1 and #3 (corresponding to tip #1 and #3).
  For LiHa 2 with 8 tips: fix belt lock to Y-slide #3 and #7 (corresponding to tip #3 and 7).
- Tension the belt by means of pulling back the motor assembly before fastening the motor fixing screws in the slotted holes.

2 Ensure Operating Readiness:

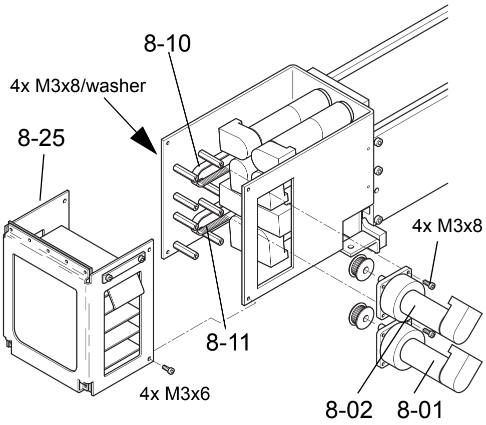
- Reference positions
- Random move
- and all tests which are necessary after removal of LiHa 1 assembly

… as described in Section 6.6.11.

6.6.8 Y-Motor and Y-Spreading Motor

Removal

1. Remove LiHa 2 assembly from the instrument (see Section 6.6.2, 'Complete LiHa 2 Assembly').
2. Unscrew and remove the board cage (8-25) with DC-Servo boards and LiHa backplane (details see Section 6.6.6, 'Electronic Boards for LiHa 2').
3. Disconnect the relevant motor cable from LiHa backplane.
4. Unscrew and remove the relevant motor assembly (8-01 or 8-02).
5. Remove pulley.



8-01	Y-spreading motor
8-02	Y-motor
8-10	Y-belt
8-11	Y-spreading belt
8-25	Board cage

Figure 6-77 Removal of Y-motor and Y-spreading motor

Installation

1. Install in reverse order.
   - Make sure the encoder head points in the correct direction as shown in Figure 6-77.
   - For correct motor cable connection refer to Figure 6-71, 'LiHa backplane cable connections'.
   - Tension the belt (8-10 or 8-11) by means of pulling back the motor assembly before fastening the motor fixing screws in the slotted holes.
2. Ensure Operating Readiness:
   - all tests which are necessary after removal of LiHa 2 assembly

   … as described in Section 6.6.11.

6.6.9 Tip Adapter

Removal

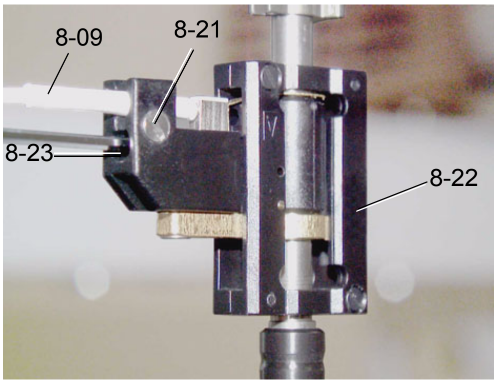


Figure 6-78 Removal of tip adapter

1. Loosen fixing screw (8-21) and set screw (8-23); disconnect ILID cable (8-09) from tip adapter.
2. Unscrew tip adapter (8-22) from Z-rod.

8-09	ILID cable
8-21	Fixing screw
8-22	Tip adapter
8-23	Set screw

Installation

1. Install in reverse order.
   - When installing the tip adapter, make sure to tighten the set screw (8-24) onto the provided bore in the tip adapter.
2. Ensure Operating Readiness:
   - Liquid detection test
   - Calibrate lower DiTi eject
   - Disposable tips test
   - Tightness check
   - Precision test

   … as described in Section 6.6.11.

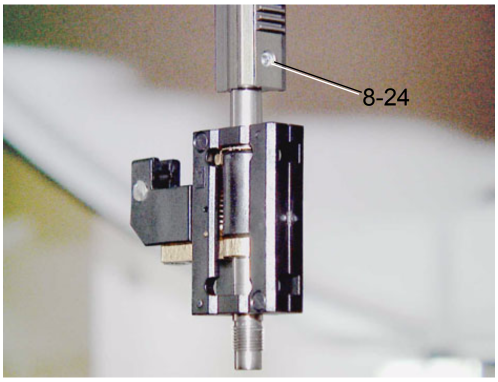


Figure 6-79 Installation of tip adapter

8-24	Set screw

6.6.10 Lower DiTi Eject Option

The lower DiTi eject is an option for RSP and RWS, for RMP only with TOPS 4.0 or later. The option may only be placed on LiHa 2 produced after January 1 1999 and with serial numbers ≥ 4000.

Lower DiTi Eject Option 1

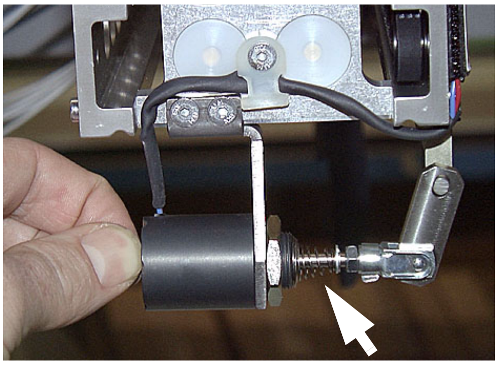


Figure 6-80 Detail of lower DiTi eject option 1

The lower DiTi eject option 1 was supplied until September 2000. In case a lower DiTi eject option 1 is not yet upgraded, we recommend to enhance the option now with the available upgrade kit (see Spare Parts).

You can easily identify a not upgraded option 1 by the spiral spring on the solenoid axle (see Figure 6-80).

Lower DiTi Eject Option 2

The lower DiTi eject option 2 is supplied as of October 2000. It includes improved solenoid mounting features and the leaf spring for the rocker which ensures proper working condition during operation.

Minimum Requirements

STOP

In case the required firmware is not yet downloaded: disconnect the lower DiTi eject option cable from the LiHa backplane (see J3, Figure 6-71, 'LiHa backplane cable connections') prior to switching on the Genesis instrument.

Minimum requirements as shown in the following table must strictly be followed. Other configuration than stated below would cause burn out of …

- *the solenoid and/or*
- *the backplane of LiHa 2 and/or*
- *the DC-Servo board (MO1, see Figure 6-71, 'LiHa backplane cable connections')*

… and thus damage the instrument.

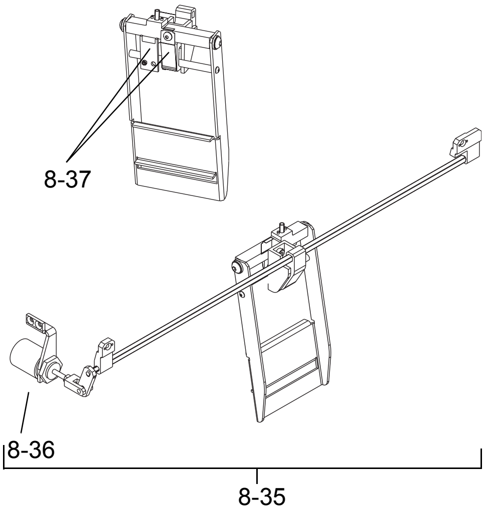
CU firmware version – control unit on instrument	Genesis instrument software version	Application software		
		Gemini software version	Logic software version	TOPS software version
V1.51 or later	V4.02 or later	V3.2 or later	V2.50 or later	V4.0 or later

Spare Parts

See Section 7.4, ‘Spare Parts LiHa 2’ for the spare parts list with part numbers.

The following items are available:

- Lower DiTi eject option 2 (4/8 tips)
- Solenoid
- Upgrade kit (rocker stop and leaf spring)



8-35	Lower DiTi eject option 2
8-36	Solenoid
8-37	Upgrade kit (rocker stop and leaf spring)

Figure 6-81 Spare parts for lower DiTi eject option

The DC-Servo board which controls the solenoid is described in Section 6.6.6, ‘Electronic Boards for LiHa 2’.

Removal of Lower DiTi Eject Option

Following information relates to a LiHa 2 with 8 tips and lower DiTi eject option 2.

For a LiHa 2 with only 4 tips or a lower DiTi eject option 1, the design is slightly different. However, the procedures described in this section remain unaltered.

Refer to Figure 6-82, ‘Removal of lower DiTi eject option 2’.

1. Remove LiHa 2 assembly as described in Section 6.6.2, ‘Complete LiHa 2 Assembly’.
2. Disconnect the solenoid cable (8-39) from the socket J3 on the backplane and free the cable from cable holders and Velcro tape.
3. Unscrew fixing screw (8-41) from the housing of the 3rd Z-rod (8-13).
4. Unscrew fixing screws (8-38) and (8-40), remove the complete lower DiTi eject option assembly.

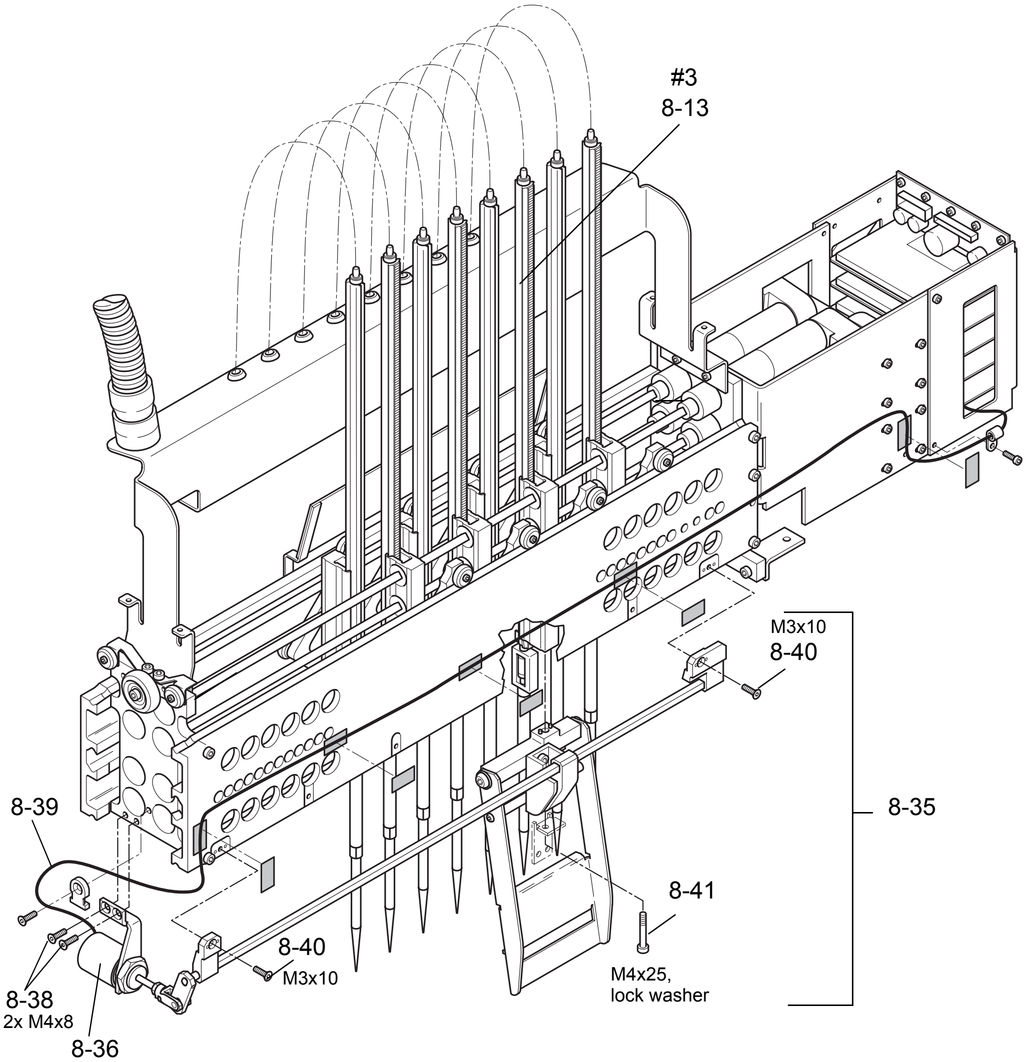


Figure 6-82 Removal of lower DiTi eject option 2

8-13	Z-rod		
8-35	Lower DiTi eject option 2	8-39	Solenoid cable
8-36	Solenoid	8-40	Fixing screw bearing block
8-38	Fixing screw solenoid holder	8-41	Fixing screw rocker assembly

Installation of Lower DiTi Eject Option 2

In case a new lower DiTi eject option 2 has to be assembled prior to installation, refer to Installation Instructions, Doc ID 391 276.

Refer to Figure 6-82, ‘Removal of lower DiTi eject option 2’.

1 Install in reverse order.

- Make sure the solenoid holder screws (8-38) are fixed tightly.

- When connecting the solenoid cable (8-39) to the backplane, make sure the cable connector is positioned in the right direction (see Figure 6-83).

STOP *Wrong direction of the cable connector to the socket J3 would cause a short circuit in the solenoid.*

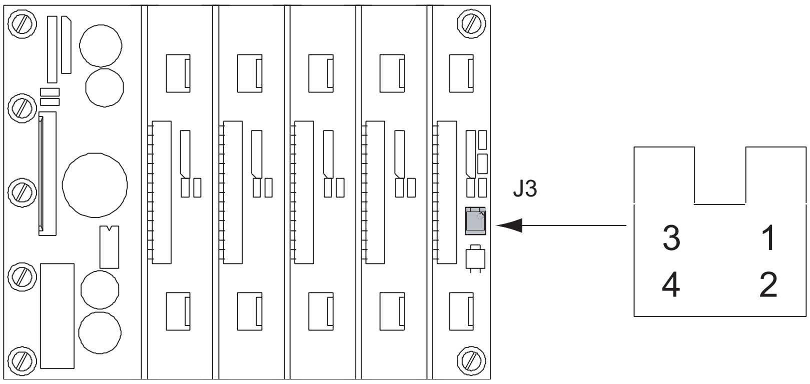


Figure 6-83 Correct connection of solenoid cable to the backplane

2 Perform Rocker Adjustment Procedure as described later in this section.

3 Ensure Operating Readiness:

- Calibrate lower DiTi eject
- and all tests which are necessary after removal of LiHa 2 assembly

… as described in Section 6.6.11.

Removal of Solenoid

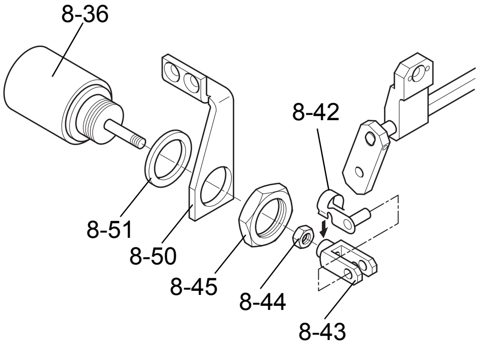
1 Remove LiHa 2 assembly as described in Section 6.6.2, 'Complete LiHa 2 Assembly'.

2 Disconnect the solenoid cable (8-39) from the socket J3 on the backplane.

3 Open and remove link lock (8-42).

4 Remove solenoid fork (8-43) and fixing nut (8-44).

5 Loosen the solenoid fixing nut (8-45), remove solenoid (8-36) from the solenoid holder (8-50).



8-36	Solenoid
8-42	Link lock
8-43	Solenoid fork
8-44	Fixing nut
8-45	Solenoid fixing nut
8-50	Solenoid holder
8-51	Washer

Figure 6-84 Removal of solenoid

Installation of Solenoid

1 Install in reverse order.

- Make sure the solenoid holder screws (Figure 6-82, 8-38) are fixed tightly.
- When connecting the solenoid cable (8-39) to the backplane, make sure the solenoid cable connector is positioned in the right direction (see Figure 6-83).

Wrong direction of the solenoid cable connector to the socket J3 would cause a short circuit in the solenoid.

2 Perform Rocker Adjustment Procedure as described later in this section.

3 Ensure Operating Readiness

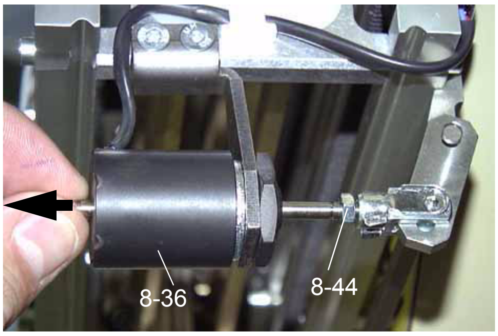
- Calibrate lower DiTi eject
- and all tests which are necessary after removal of LiHa 2 assembly

4 … as described in Section 6.6.11.

Rocker Adjustment Procedure

Perform the rocker adjustment procedure …

- after installation of the solenoid or the complete lower DiTi eject option,
- whenever the rocker touches the Z-rods on the LiHa 2,
- if DiTis are not ejected.



1 Manually pull the solenoid axle back to check the distance between the rocker assembly (8-46) and the Z-rods (8-13):

In the eject position, the overlapping between rocker nose and tip adapter distance must be between 2 and 3 mm.

No part of the rocker assembly may touch the Z-rods at any time.

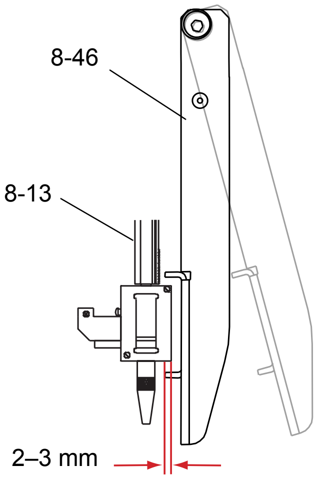


Figure 6-85 Rocker adjustment

8-13	Z-rod
8-36	Solenoid
8-44	Fixing nut
8-46	Rocker assembly

2 If necessary adjust the overlapping by means of the set screw (8-47) on the rocker stop:

- Turn the set screw (8-47) clockwise to decrease the overlap.
- Turn the set screw counterclockwise to increase the overlap.

3 Loosen the fixing nut (8-44).

4 Reduce the clearance between rocker shaft (8-48) and moving lever guide (8-49) to an absolute minimum (they may just about to touch):

   - Turn the solenoid axle clockwise to reduce the clearing till the rocker moves away from the moving lever guide.
   - Then turn 1/2 turn only counter-clockwise.

5 Tighten the fixing nut (8-44).

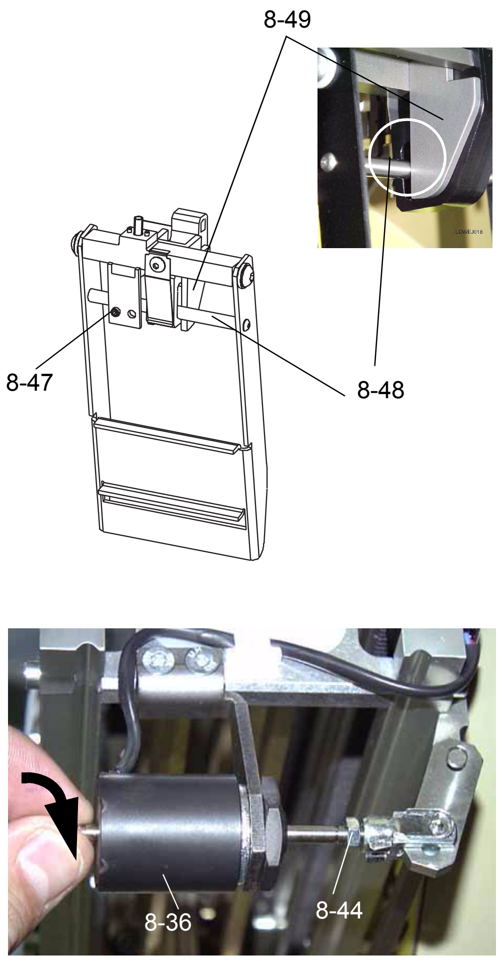


Figure 6-86 Rocker adjustment

8-36	Solenoid
8-44	Fixing nut
8-47	Set screw
8-48	Rocker shaft
8-49	Moving lever guide

6.6.11 Ensure Operating Readiness

Required Special Tools

- Reference tip

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing parts of the LiHa 2, verify – and if necessary carry out – the following settings and tests:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). *Necessary after replacement of* • *LiHa 2 assembly* • *any PCB*

2	– LiHa reference positions – Random move *Attention: never perform a random move test with a Genesis RMP!* *Necessary after replacement of* • *LiHa 2 assembly* • *any LiHa 2 belt* • *X-flex cable*
3	Liquid detection test *Necessary after replacement of* • *LiHa 2 assembly* • *X-flex cable* • *ILID cable, flat cable, chip or board* • *LiHa backplane* • *Tip adapter*
4	– Calibrate lower DiTi eject – Disposable tips test (DiTi eject test) *Necessary after replacement of* • *LiHa 2 assembly* • *Tip adapter* • *Lower DiTi eject option*
5	– Tightness check: fill/flush system and check all tubing connections – Precision test *Necessary after replacement of* • *LiHa 2 assembly* • *Tip adapter*

6.7 RoMa 1 – Disassembly and Assembly Procedures

Supplied until October 2000.

The X-DC-Servo board – which controls the X-motor of the RoMa – is described in Section 6.3.5, ‘Electronic Boards’.

The X-belt as well as the X-motor are described in Section 6.3.3, ‘X-Drive Assembly’.

6.7.1 Overview

RoMa 1 in Comparison with RoMa 2

Summary of the most obvious differences between RoMa 1 and RoMa 2:

Item	RoMa 1	RoMa 2
Guide rollers	not pre-tensioned	pre-tensioned
Z-brake	passive, mechanical	active, electromechanical
Side plates	not necessary	necessary for reinforcement
X-support	not adjustable	with adjusting screws

Special Tools

- Reference tip
- Teach plate
- Crimp release tool

RoMa 1 Spare Parts

See Section 7.5, ‘Spare Parts RoMa 1’ *for the spare parts list with part numbers.*

The following items can be replaced as spare parts:

- RoMa 1 assembly
- Mechanical parts:
  Gripper module
  Long gripper finger
  Short gripper finger
  Y-belt
- Electronic boards:
  Gripper board
  Z/G-DC-Servo board
  Y/R-DC-Servo board
  RoMa 1 backplane
- Motors:
  Rotator motor
  Z-DC-Servo motor
  Y-DC-Servo motor

- Flex cables:

  X-flex cable

  Gripper/Rotator flex cable
- Z-brake

Location of Spare Parts

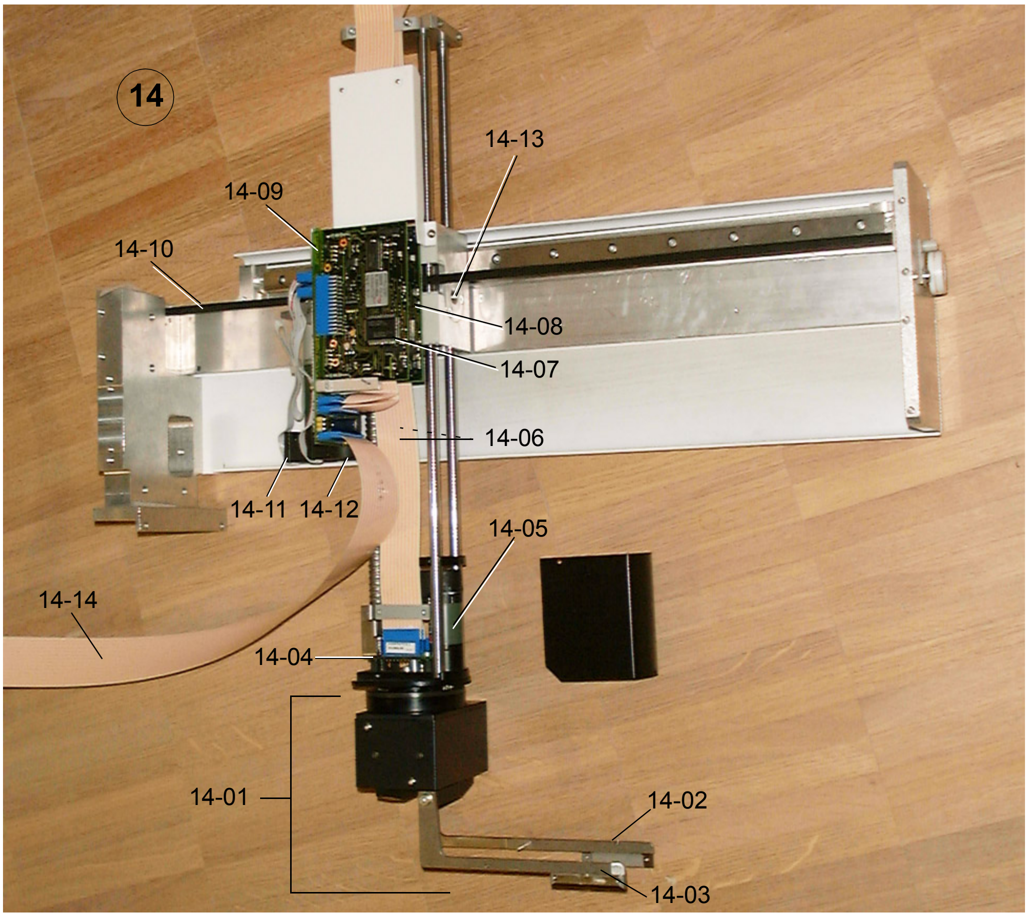

14
14-13
14-09
14-10
14-08
14-07
14-06
14-11
14-12
14-05
14-14
14-04
14-01
14-02
14-03

Figure 6-87 RoMa 1 spare parts

14	RoMa 1 assembly	14-01	Gripper module (incl. gripper fingers)
14-02	Long gripper finger	14-03	Short gripper finger
14-04	Gripper board	14-05	Rotator motor
14-06	Gripper/Rotator flex cables	14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board	14-09	RoMa 1 backplane
14-10	Y-Belt	14-11	Y-motor
14-12	Z-motor	14-13	Z-brake
14-14	X-flex cable		

Gripper Module The spare part gripper module (14-01) is a set that includes the following parts:

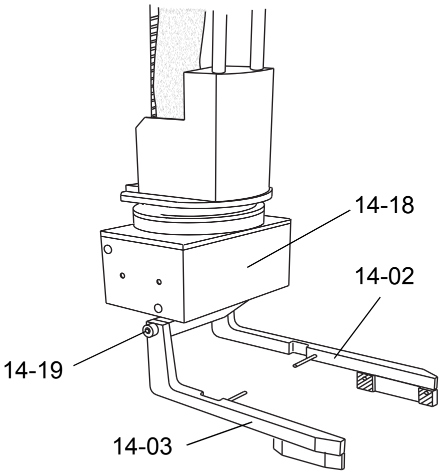


Figure 6-88 Gripper module

- gripper module head (14-18)
- long gripper finger (14-02)
- short gripper finger (14-03)
- fixing screws (14-19)

Gripper Fingers

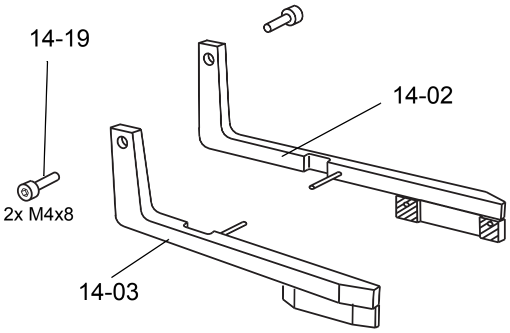


Figure 6-89 Gripper finger

Note that the gripper fingers are not the same length:

- Long gripper finger (14-02): 161 mm
- Short gripper finger (14-03): 131 mm
- Fixing screws (14-19)

6.7.2 Complete RoMa 1 Assembly

Removal

1. Disconnect the X-flex cable (14-14) from the Optibo board (left service compartment) and unscrew the respective cable clamp in the X-bay. Also see Section 6.7.6, ‘X-Flex Cable’.
2. Carefully pull the X-flex cable out of the cable duct.
3. Unscrew the RoMa 1 from the X-slide and lift it carefully out of the guide rail (arm guide (7)) and off the X-slide.

Installation

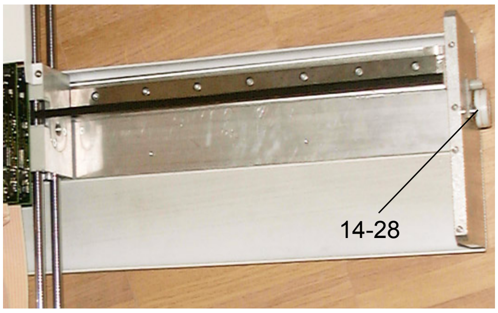


Figure 6-90 Cable clamp in X-bay

1. Clean the contact surface of the guide rail and the support roller (14-28) with a lint-free tissue and some ethyl alcohol.

14-28	Support roller

2. Install in reverse order.
   For correct cable connection on the Optibo see Figure 6-20, ‘Optibo cable connections’.
3. Ensure operating readiness as described in Section 6.7.13.

6.7.3 Gripper Fingers

The procedures for removing, installing and adjusting the gripper fingers are identical with those for RoMa 2.

1. Follow the instructions given in Section 6.8.4, ‘Gripper Fingers’.

6.7.4 Gripper Module Head, Gripper Board

The gripper module head (14-18) or the gripper board (14-04) are rather difficult to remove since their fixing screws are not well accessible. Whenever possible, replace the whole RoMa 1 and do not take it apart in the field.

The procedures for removing and installing the gripper module head or the gripper board are identical with those for RoMa 2.

1. Follow the instructions given in Section 6.8.5, ‘Gripper Module Head, Gripper Board’.
2. Ensure operating readiness as described in Section 6.7.13.

6.7.5 Rotator Motor

The rotator motor (14-05) is rather difficult to remove since its fixing screws are not well accessible. Whenever possible, replace the whole RoMa 1 and do not take it apart in the field.

The procedures for removing and installing the rotator motor are identical with those for RoMa 2.

1. Follow the instructions given in Section 6.8.6, ‘Rotator Motor’.
2. Ensure operating readiness as described in Section 6.7.13.

6.7.6 X-Flex Cable

The procedures for removing and installing the X-flex cable are identical with those for RoMa 2.

1. Follow the instructions given in Section 6.8.7, ‘X-Flex Cable’.
2. Ensure operating readiness as described in Section 6.7.13.

6.7.7 Gripper/Rotator Flex Cables

The procedures for removing and installing the gripper/rotator flex cables (14-06) are identical with those for RoMa 2.

1. Follow the instructions given in Section 6.8.8, ‘Gripper/Rotator Flex Cables’

   Note: Correct connection of the gripper/rotator flex cables:
   Gripper board J3 ? RoMa 1 backplane: J5
   Gripper board J4 ? RoMa 1 backplane: J6

6.7.8 Y/R- and Z/G-DC-Servo Board

The procedures for removing and installing the DC-servo boards (14-07, 14-08) are practically identical with those for RoMa 2.

1. Follow the instructions given in Section 6.8.9, ‘Y/R- and Z/G-DC-Servo Board’
2. Ensure operating readiness as described in Section 6.7.13.

6.7.9 RoMa 1 Backplane

Although the RoMa 1 backplane (14-09) differs from the RoMa 2 backplane the procedures for removing and installing are practically identical with those for RoMa 2.

1 Follow the instructions given in Section 6.8.10, ‘RoMa 2 Backplane’.
   - Refer to Figure 6-91, ‘RoMa 1 backplane connections (component side: left, solder side: right)’ for correct connections to the RoMa 1 backplane.

2 Ensure operating readiness as described in Section 6.7.13.

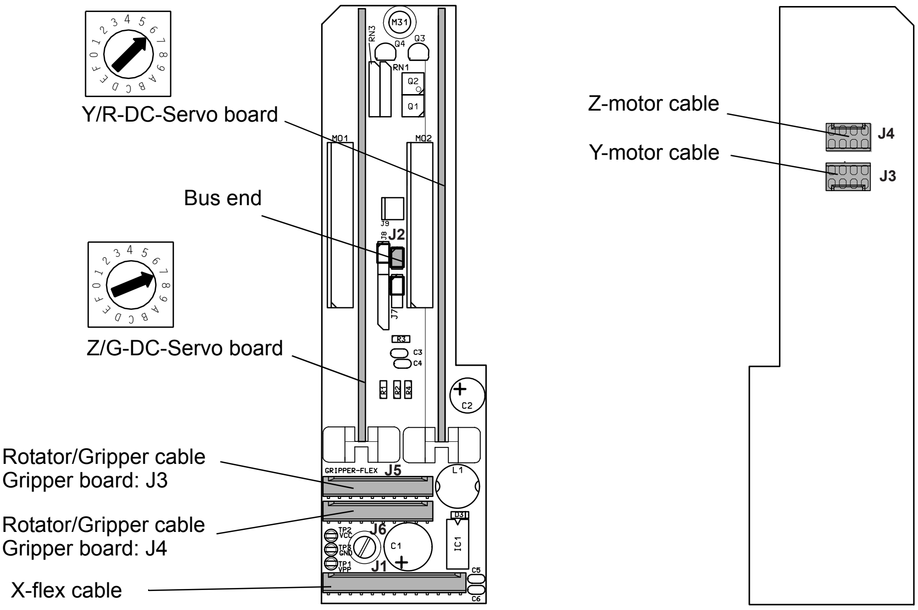

Y/R-DC-Servo board
Bus end
Z/G-DC-Servo board
Rotator/Gripper cable
Gripper board: J3
Rotator/Gripper cable
Gripper board: J4
X-flex cable
Z-motor cable
Y-motor cable
J4
J3
J2
GRIPPER-FLEX J5
J6
J1
M31
RN3
RN1
Q1
Q2
Q3
Q4
MO1
MO2
C1
C2
L1
IC1

Figure 6-91 RoMa 1 backplane connections (component side: left, solder side: right)

6.7.10 Y-Belt

The procedures for removing and installing the Y-belt (14-10) are identical with those for RoMa 2.

1 Follow the instructions given in Section 6.8.11, ‘Y-Belt’

2 Ensure operating readiness as described in Section 6.7.13.

6.7.11 Y- and Z-Motor

The procedures for removing and installing the Y-motor (14-11) and the Z-motor (14-12) are identical with those for RoMa 2.

1 Follow the instructions given in
   - Section 6.8.12, ‘Y-Motor’
   - and Section 6.8.13, ‘Z-Motor’.

2 Ensure operating readiness as described in Section 6.7.13.

6.7.12 Z-Brake

Removal

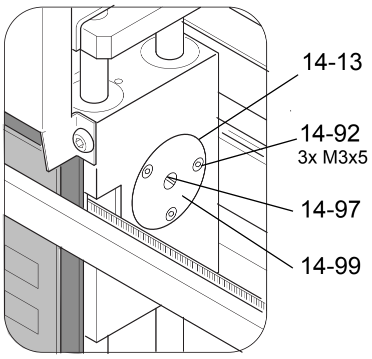


Figure 6-92 Z-brake

14-13	Z-brake
14-92	Fixing screw
14-97	Adjustment screw
14-99	Pressure flange

1 Unscrew and remove the Z-brake.

Installation

1 Clean all parts with a 70 % alcohol solvent.

2 Replace broken parts.

3 Install in reverse order.

Adjusting the Z-Brake

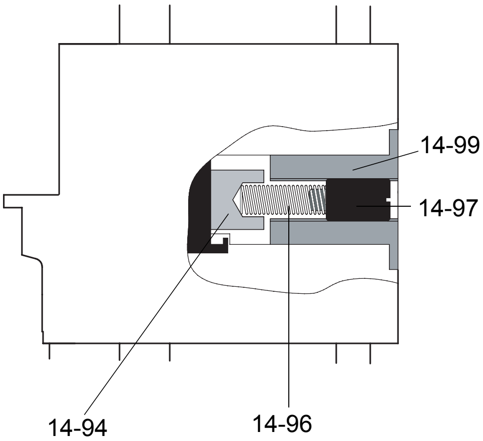


Figure 6-93 Z-brake adjustment

14-94	Brake shoe
14-96	Pressure spring
14-97	Adjustment screw
14-99	Pressure flange

For the following test and adjustment the instrument must be switched off and the gripper fingers must be installed.

1 Place an object of approx. 400 g on the gripper fingers.

2 Check whether the object moves downwards. If so turn the adjustment screw (14-97) clockwise just until the movement stops.

3 Repeat the test over the entire length of the Z-drive. Readjust if necessary.

4 Secure the adjustment screw with safety lacquer when finished.

5 Ensure operating readiness as described in Section 6.7.13.

6.7.13 Ensuring Operating Readiness

Purpose

Most of the procedures described in this section require you to remove the entire RoMa before you can replace a damaged part. For this reason the adjustments and tests described below must be carried out after reinstallation.

Required Special Tools

- Reference tip
- RoMa test plate

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing most parts of the RoMa 1, verify – and if necessary carry out – the following settings and tests:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3). *Necessary if entire RoMa or backplane or X-flex cable were replaced.*
2	RoMa reference positions *Note: It may be necessary to check and readjust the taught positions in the application software as well.*
3	RoMa test
4	Random move *Attention: never perform a random move test with a Genesis RMP!*

After Finishing

1. Reinstall all covers you have removed.
2. Close service doors and X-bay covers.
3. Put objects you removed before back on the worktable.
4. Start the Instrument in operating mode.

6.8 RoMa 2 – Disassembly and Assembly Procedures

Supplied as of October 2000.

The X-DC-Servo board – which controls the X-motor of the RoMa – is described in Section 6.3.5, 'Electronic Boards'.

The X-belt as well as the X-motor are described in Section 6.3.3, 'X-Drive Assembly'.

6.8.1 Overview

RoMa 1 in Comparison with RoMa 2

Summary of the most obvious differences between RoMa 1 and RoMa 2:

Item	RoMa 1	RoMa 2
Guide rollers	not pre-tensioned	pre-tensioned
Z-brake	passive, mechanical	active, electromechanical
Side plates	not necessary	necessary for reinforcement
X-support	not adjustable	with adjusting screws

Special Tools

- Mounting bracket
- Reference tip
- Teach plate
- Crimp release tool

RoMa 2 Spare Parts

See Section 7.6, 'Spare Parts RoMa 2' *for the spare parts list with part numbers.*

The following items can be replaced as spare parts:

- RoMa 2 assembly
- Mechanical parts
  Gripper module
  Long gripper finger
  Short gripper finger
  Y-belt
- Electronic boards
  Gripper board
  Z/G-DC-Servo board
  Y/R-DC-Servo board
  RoMa 2 backplane
- Motors
  Rotator motor

Z-DC-Servo motor

Y-DC-Servo motor

- Flex cables

X-flex cable

Gripper/Rotator flex cable

- Z-brake

Location of Spare Parts

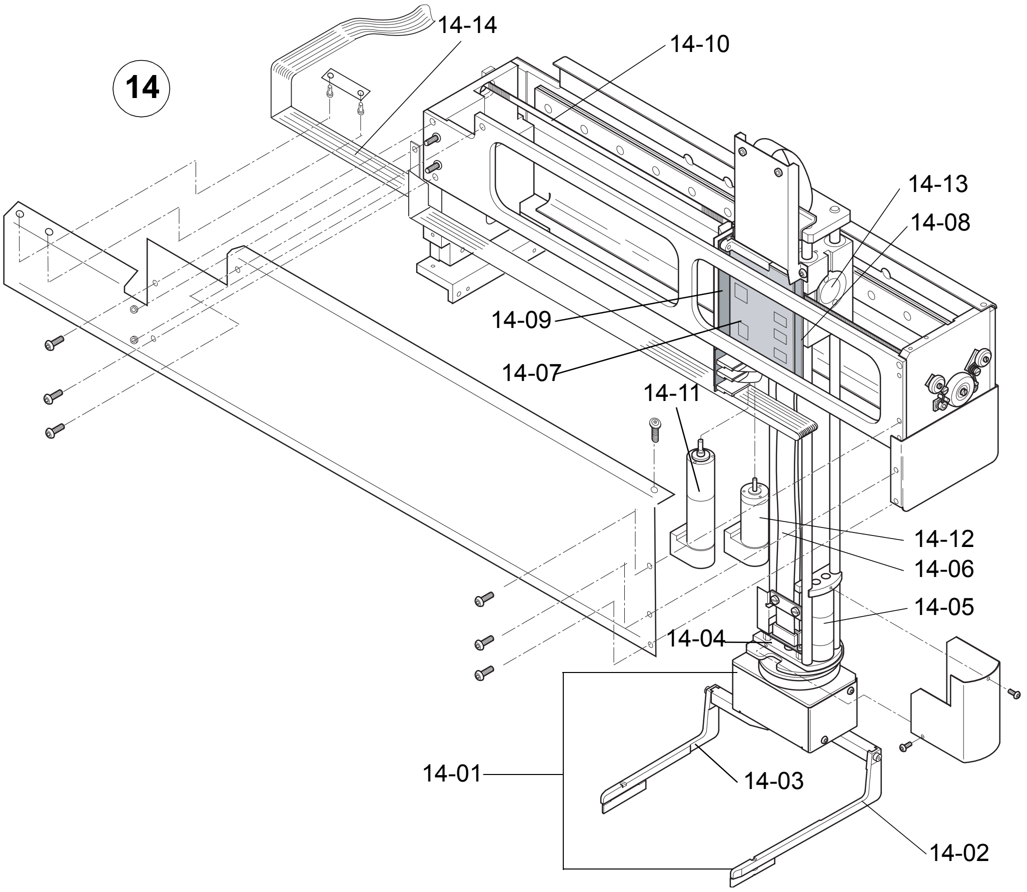
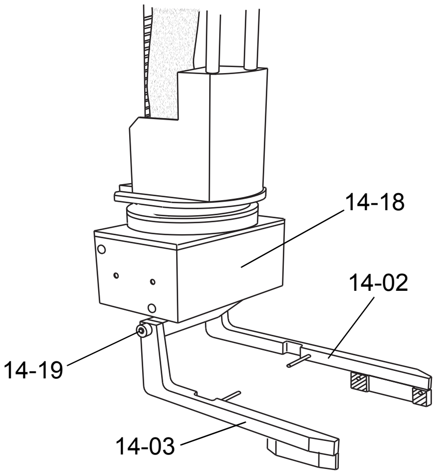

14
14-14
14-10
14-13
14-08
14-09
14-07
14-11
14-12
14-06
14-05
14-04
14-01
14-03
14-02

Figure 6-94 RoMa 2 spare parts

14	RoMa 2 Assembly	14-01	Gripper module (incl. gripper fingers)
14-02	Long gripper finger	14-03	Short gripper finger
14-04	Gripper board	14-05	Rotator motor
14-06	Gripper/Rotator flex cables	14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board	14-09	RoMa 2 backplane
14-10	Y-Belt	14-11	Y-motor
14-12	Z-motor	14-13	Z-brake
14-14	X-flex cable		

Gripper Module

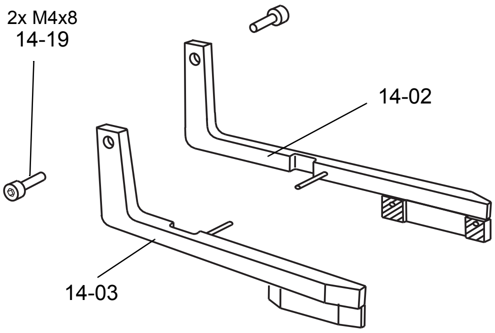
The spare part gripper module (14-01) is a set that includes the following parts:



- gripper module head (14-18)
- long gripper finger (14-02)
- short gripper finger (14-03)
- fixing screws (14-19)

Figure 6-95 Gripper module

Gripper Fingers



Note that the gripper fingers are not the same length:

- Long gripper finger (14-02): 161 mm
- Short gripper finger (14-03): 131 mm
- Fixing screws (14-19)

Figure 6-96 Gripper finger

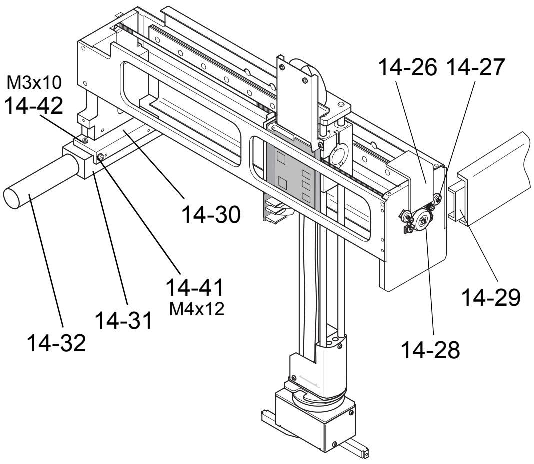
6.8.2 Complete RoMa 2 Assembly

Removal

1. Disconnect the X-flex cable (14-14) from the Optibo board (left service compartment) and unscrew the respective cable clamp in the X-bay. Also see Section 6.8.7, 'X-Flex Cable'.
2. Carefully pull the X-flex cable out of the cable duct.
3. Unscrew the RoMa 2 from the X-slide (14-31) and lift RoMa 2 carefully out of the guide rail (14-29) and off the X-slide.

Installation

1. Clean the contact surface of the guide rail (14-29) as well as the guide rollers (14-27) and the support roller (14-28) with a lint-free tissue and some ethyl alcohol.
2. Insert the mounting bracket (14-26) to press the guide rollers (14-27) apart.



14-26	Mounting bracket (only needed for installation)
14-27	Guide rollers
14-28	Support roller
14-29	Guide rail
14-30	X-support
14-31	X-slide
14-32	X-shaft
14-41	Fixing screw
14-42	Fixing screw

Figure 6-97 Installing the RoMa 2

3. Install in reverse order.
   For correct cable connection on the Optibo see Figure 6-20, 'Optibo cable connections'.
4. Perform the mechanical adjustment according to Section 6.8.3, 'Mechanical Adjustment After Reinstallation'.
5. Ensure operating readiness as described in Section 6.8.15.

6.8.3 Mechanical Adjustment After Reinstallation

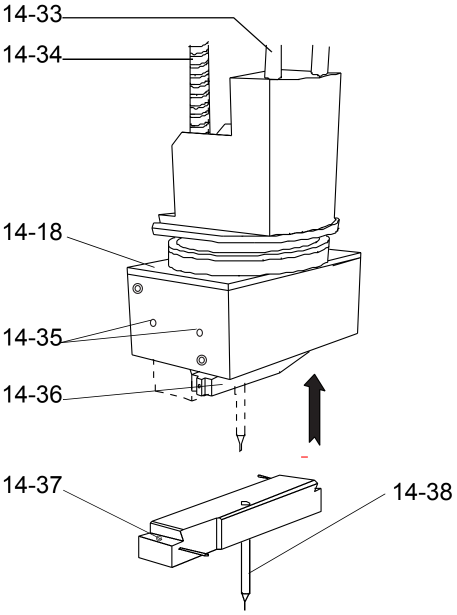
Why Adjust?

After the RoMa 2 has been installed so far, it must be aligned with the positioning pins on the worktable. The purpose of this alignment is to ensure that the RoMa 2 runs parallel to the positioning pins when it moves in the Y-axis (from back to front and vice versa).

Note

This is only a mechanical pre-adjustment. For further tests and adjustments see Section 6.8.15, 'Ensuring Operating Readiness'

Installing the Reference Tip



14-18	Gripper module head
14-33	Z-rods
14-34	Z-spindle
14-35	Screws for positioning gripper finger supports manually
14-36	Gripper finger support
14-37	Protruding screw
14-38	Reference tip

Figure 6-98 Fixing the reference tip to the gripper module

1. Move the RoMa 2 by its Z-rods (14-33) to the front center above the worktable.
2. Insert the reference tip (14-38) between the two gripper finger supports (14-36):
   - The protruding screw (14-37) must be on the side of the screws (14-35).
   - Turn one of the screws (14-35) until the reference tip can be inserted between the gripper finger supports (17-36).
3. Fix the reference tip (14-38) to the gripper module head (14-18) by turning one of the screws (14-35) in the opposite sense. Make sure the reference tip (14-38) is firmly held by the gripper finger supports (14-36).

Alignment in Y-Axis

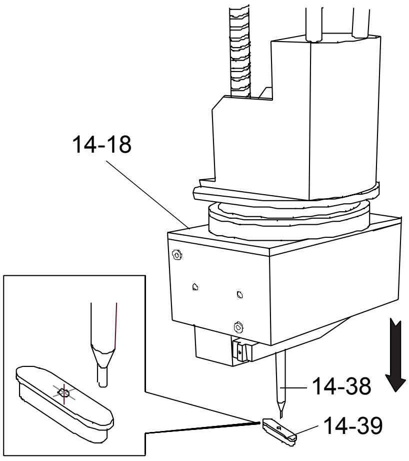
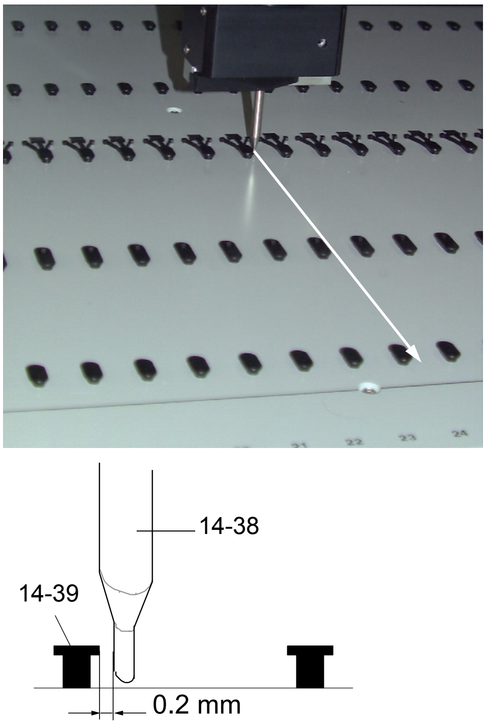


Figure 6-99 Positioning the reference tip

1. Pull the gripper module head (14-18) downwards.
2. Move the reference tip (14-38) close to the right edge of a positioning pin (14-39) in the third row from the front on the worktable. Distance from positioning pin: approx. 0.2 mm.

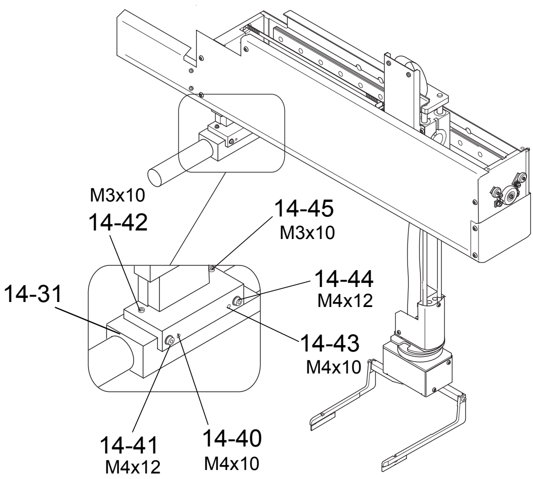


3. Firmly hold the X-slide (14-31 in Figure 6-101) with one hand. Ensure that the RoMa 2 cannot move in the X-axis during the following test.
4. Pull the RoMa 2 in the Y-axis (from rear to front) past three positioning pins (14-39) towards the front of the instrument.

The distance between the positioning pins (14-39) and the reference tip (14-38) must not exceed 0.2 mm.

Figure 6-100 Checking the distance positioning pin – reference tip

Aligning in Y-axis (Continued)



14-31	X-slide
14-40	Left set screw
14-41	Left fixing screw
14-42	Left fixing screw
14-43	Right set screw
14-44	Right fixing screw
14-45	Right fixing screw

Figure 6-101 Fixing and adjusting screws on X-support

5 Use the set screws (14-40) and (14-43) to adjust the moving direction of the RoMa 2.

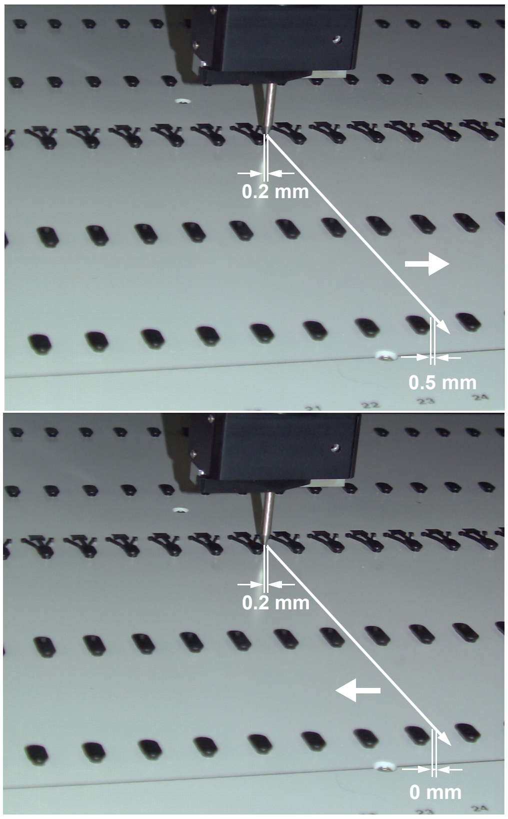


Figure 6-102 Correction of drifts

6 If the RoMa 2 drifts to the right turn the left set screw (14-40) to correct.

7 If the RoMa 2 drifts to the left turn the right set screw (14-43) to correct.

8 Repeat steps 3 to 7 until the RoMa 2 moves parallel to the positioning pins.

9 Tighten the fixing screws when finished (see Figure 6-101).

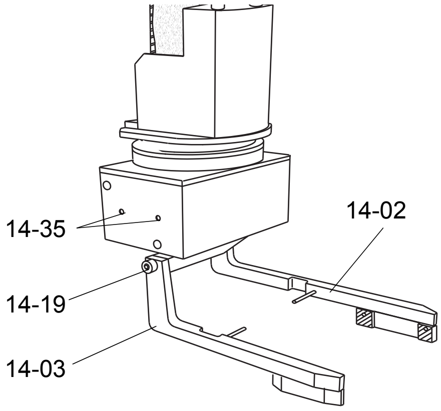
10 Remove the reference tip (14-38).

11 Install the gripper fingers (see Section 6.8.4).

12 Carry out further steps to ensure operating readiness. See Section 6.8.15 for details.

6.8.4 Gripper Fingers

Removal



14-02	Long gripper finger
14-03	Short gripper finger
14-19	Fixing screw M4 x 8
14-35	Screws for moving gripper fingers manually.

1 Unscrew and remove the long and short gripper fingers.

Figure 6-103 Gripper fingers

Installation

1 Install the short and long gripper fingers (14-02) and (14-03).

Important! Make sure you install them correctly as shown in Figure 6-104.

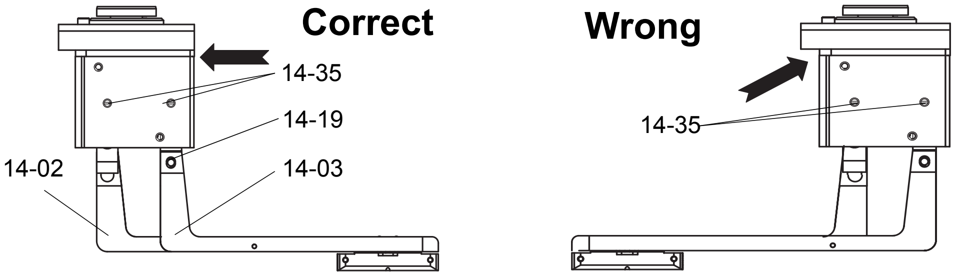
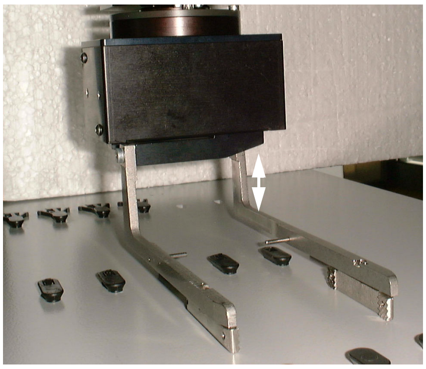


Figure 6-104 Correct installation of the gripper fingers

Adjusting the Gripper Fingers



1 Carefully pull the gripper module down until one of the gripper fingers just touches the surface of the worktable.

2 If the distances of the gripper fingers from the worktable are not equal adjust the height of the long gripper finger. Tolerance limit: 0.5 to 1 mm.

3 Tighten the fixing screw of the long gripper finger when finished.

Figure 6-105 Distance between worktable and gripper base

6.8.5 Gripper Module Head, Gripper Board

Recommendation The gripper module head (14-18) or the gripper board (14-04) are rather difficult to remove since their fixing screws are not well accessible. Whenever possible, replace the whole RoMa 2 and do not take it apart in the field.

Overview

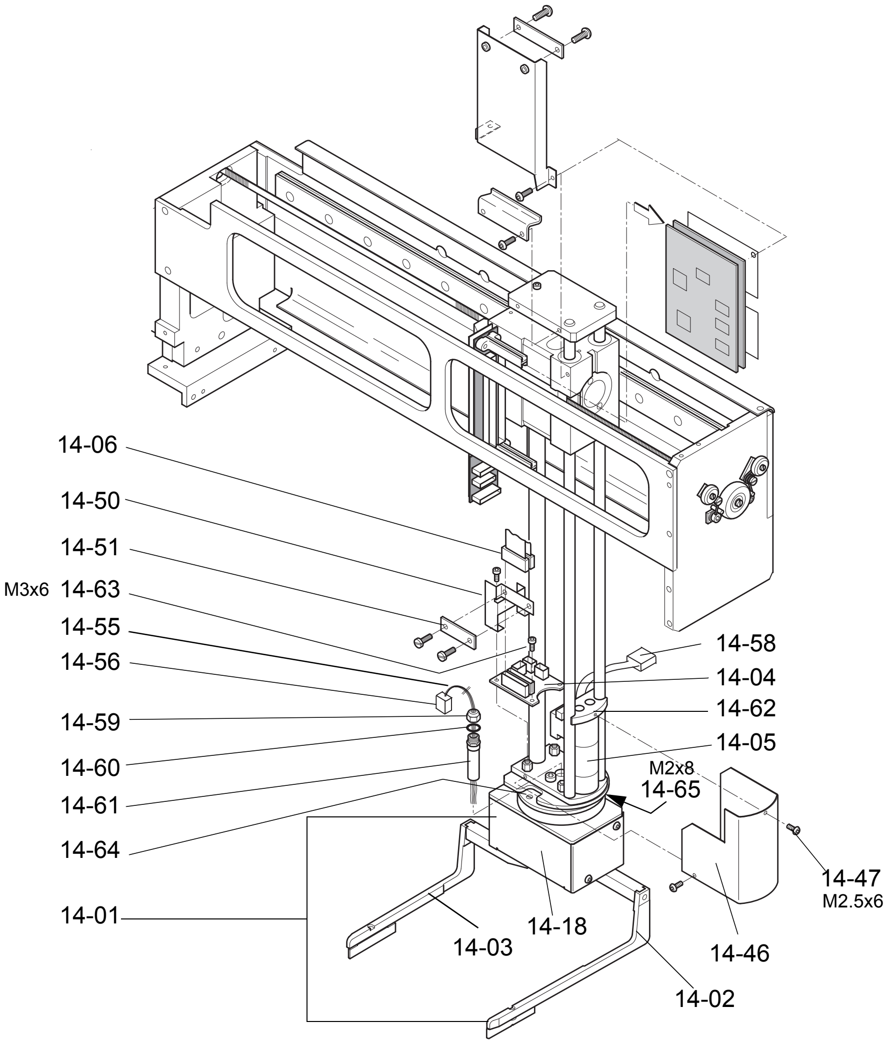

14-06
14-50
14-51
M3x6 14-63
14-55
14-56
14-59
14-60
14-61
14-64
14-01
14-03
14-18
14-58
14-04
14-62
14-05
M2x8
14-65
14-47
M2.5x6
14-46
14-02

Figure 6-106 Overview of rotator and gripper modules

14-01	Gripper module (incl. gripper fingers!)	14-02	Long gripper finger
14-03	Short gripper finger	14-04	Gripper board
14-05	Rotator motor	14-06	Gripper/Rotator flex cables
14-18	Gripper module head	14-46	Rotator cover
14-47	Fixing screws	14-50	Cable bracket
14-51	Cable clamp	14-55	Gripper motor cable
14-56	Cable connector	14-58	Rotator motor cable
14-59	Cap nut	14-60	O-ring
14-61	Bushing	14-62	Z-stop
14-63	Fixing screws (gripper board)	14-64	Fixing screws (Gripper module)
14-65	Fixing screws (rotator motor)		

Removal

Disconnecting the Cables

Details see Figure 6-106.

1 Unscrew the rotator cover (14-46).

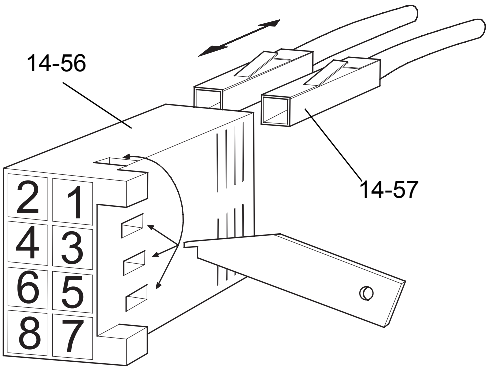
2 Remove the cable clamps (14-51).

3 Unscrew cable bracket (14-50).

4 Disconnect all cables from the gripper board (14-04):

- Gripper/Rotator flex cables (14-06)
  Mark designation (J3, J4) on respective connector!
- Rotator motor cable (14-58).
- Gripper motor cable (14-55).

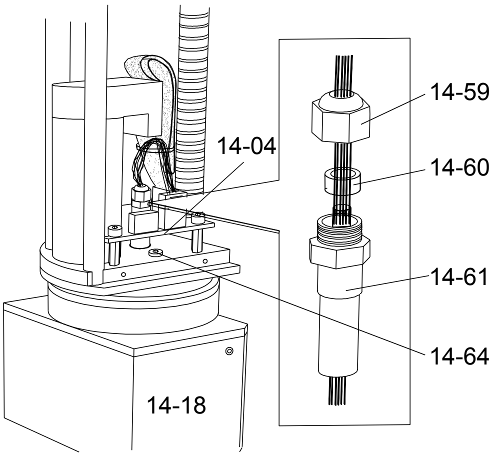
Extracting the Wires



5 Use the crimp release tool to extract the individual wires from the connector (14-56). Be careful not to damage the contact bushes (14-57).

Figure 6-107 Gripper motor cable plug

Removing the Gripper Module Head and the Gripper Board



6 Remove the cap nut (14-59), the O-ring (14-60) and the bushing (14-61).

Important! Be careful not to damage the individual wires of the gripper cable!

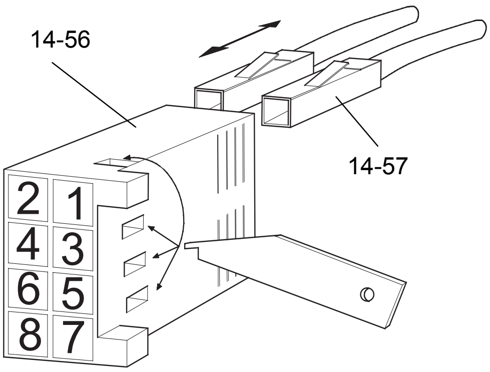
7 Unscrew and remove the gripper board (14-04).

8 Loosen the screws (14-64) and carefully remove the gripper module head (14-18).

Figure 6-108 Removing the gripper module head

Installation

1 Execute the previous steps 1 to 8 in reverse order.


14-56
14-57
2
1
4
3
6
5
8
7

- Make sure you insert the contact bushes (14-57) correctly into the housing of the connector (14-56).
- Notice the wire colors.

Pin 1	White	Pin 2	Not used
Pin 3	Yellow	Pin 4	Red
Pin 5	Green	Pin 6	Black
Pin 7	Not used	Pin 8	Violet

Figure 6-109 Reassemble connector correctly

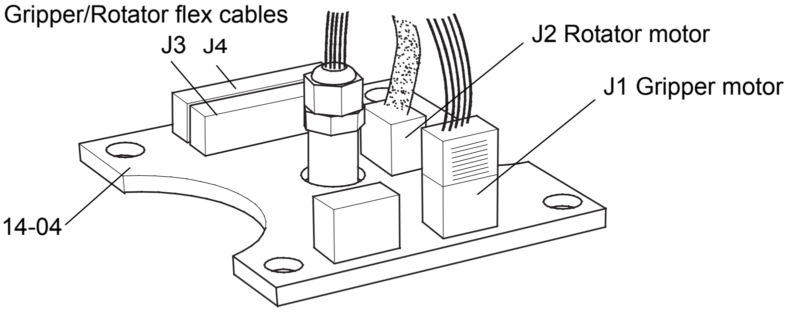

Gripper/Rotator flex cables
J3
J4
J2 Rotator motor
J1 Gripper motor
14-04

Figure 6-110 Gripper board cable connections

2 Ensure operating readiness according to Section 6.8.15.

6.8.6 Rotator Motor

Recommendation The rotator motor (14-05) is rather difficult to remove since its fixing screws are not well accessible. Whenever possible, replace the whole RoMa 2 and do not take it apart in the field.

Removal

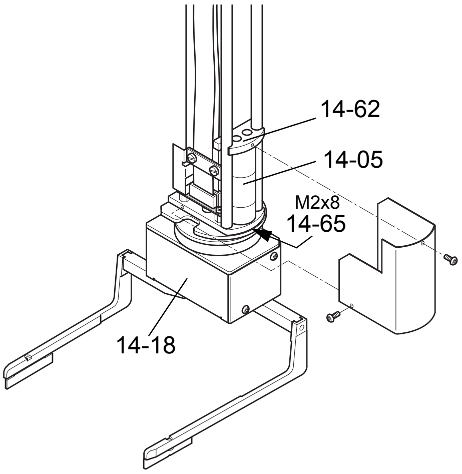


Figure 6-111 Removal of rotator motor

1 Remove the gripper module head (14-18) to get access to the fixing screws (14-65) of the rotator motor (14-05). See Section 6.8.5

2 Remove the Z-stop (14-62).

3 Unscrew and remove the rotator motor (14-05).

14-05	Rotator motor
14-18	Gripper module head
14-62	Z-stop
14-65	Fixing screws

Installation

1 Install the rotator motor (14-05).

2 Reinstall the gripper module head (14-18) according to section Section 6.8.5.

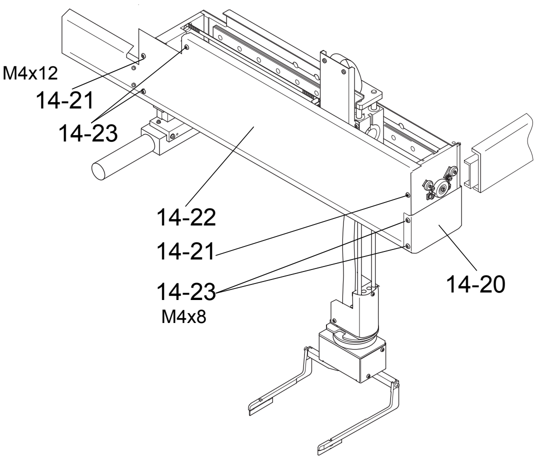
3 Ensure operating readiness according to Section 6.8.15.

6.8.7 X-Flex Cable

Before You Begin

1. Open the left access door and the X-bay covers if not done yet.
2. Move the RoMa 2 to the right side of the instrument.

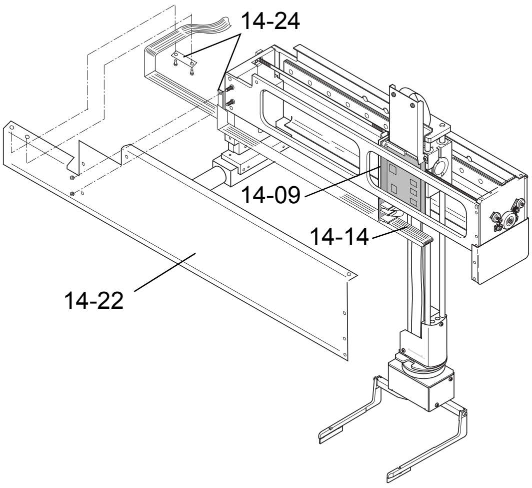
Removal



14-20	Front cover
14-21	Fixing screws
14-22	Left side cover
14-23	Fixing screws

1. Unscrew the front cover (14-20)
2. Unscrew the left side cover (14-22). Hold it firmly with your hand.

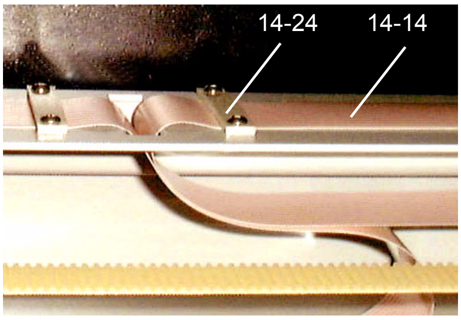
Figure 6-112 Removing the covers



14-09	RoMa 2 backplane
14-14	X-flex cable
14-22	Left side cover
14-24	Cable clamps

3. Move the left side cover (14-22) a little towards the left until the X-flex cable (14-14) becomes accessible.
4. Disconnect the X-flex cable (14-14) from the RoMa 2 backplane (14-09).
5. Unscrew the cable clamps (14-24).

Figure 6-113 Disconnecting the cable



6. Unscrew the cable clamp (14-24) in the X-bay.

Figure 6-114 Cable clamp in X-bay

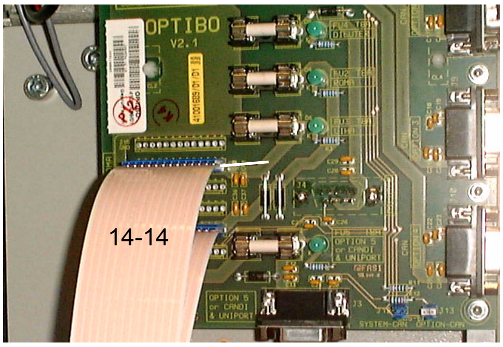


Figure 6-115 Connection of X-flex cable to Optibo board

7 Disconnect the X-flat cable from socket J6 on the Optibo board (on the left side).

8 Now you can remove the X-flex cable.

   - Carefully pull it through the opening below the Optibo board and the one in the X-bay (see Figure 6-114).

Preparing the Installation

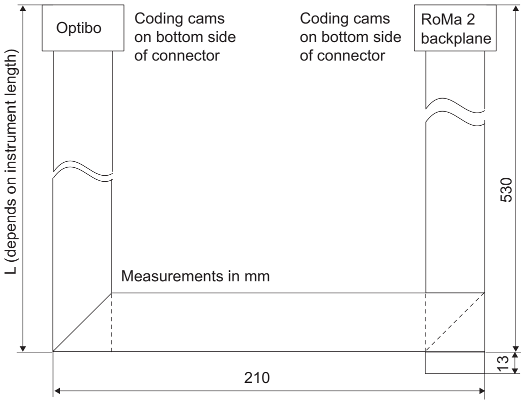
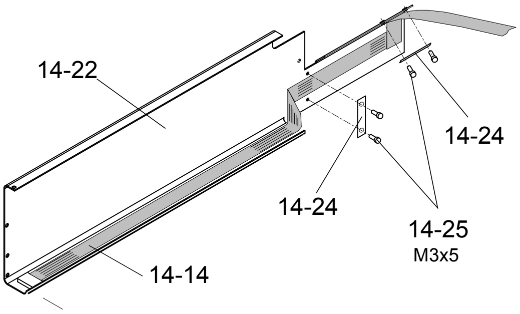

Optibo
Coding cams on bottom side of connector
Coding cams on bottom side of connector
RoMa 2 backplane
L (depends on instrument length)
530
Measurements in mm
210
13

Figure 6-116 Folding the X-flex cable

Normally, the replacement X-flex cable (14-14) is not folded when it is shipped.

1 Fold the cable according to the cable you have removed.
Also see Figure 6-116.

Installation


14-22
14-24
14-24
14-25
M3x5
14-14

14-14	X-flex cable
14-22	Left side cover
14-24	Cable clamps
14-25	Fixing screws

2 Fix the folded X-flex cable (14-14) to the left side cover (14-22).

Figure 6-117 Fixing the X-flat cable to the side cover

3 Connect the cable to the RoMa 2 backplane (14-09). See Figure 6-125, ‘RoMa 2 backplane connections (component side: left, solder side: right)’.

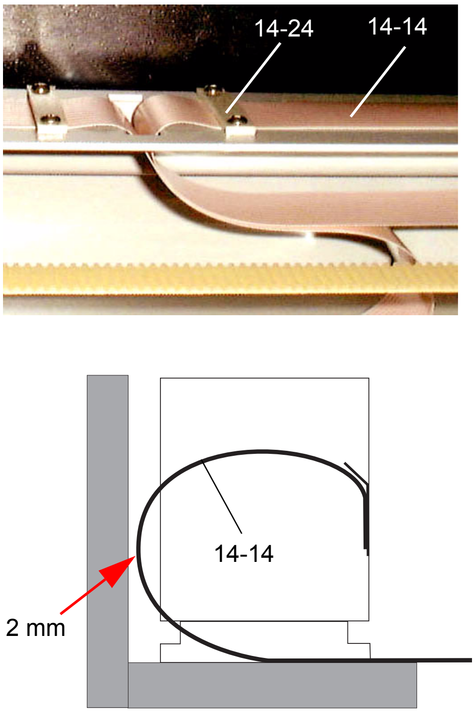
Important! Be careful not to overstretch the X-flex cable!

4 Screw the side cover to the RoMa 2.

5 Move the RoMa 2 to the right half of the instrument.

6 Form a loop with the X-flat cable in the X-bay.

Important! The cable must lay flat on the surface of the X-bay. Make sure the cable is neither twisted nor bent too much.



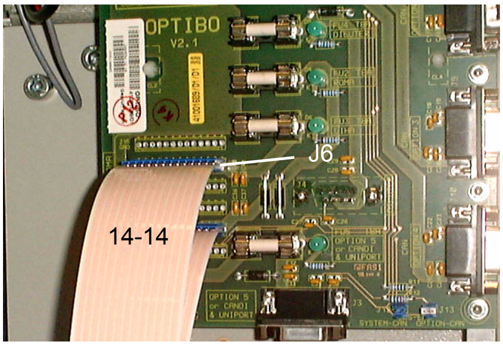
7 Draw the end of the X-flex cable (14-14) through the opening in the middle of the X-bay.

8 Fix it with the cable clamp (14-24).

Make sure there is a gap of approx. 2 mm between X-flex cable and the frame of the instrument when the RoMa is moved to the very right side.

9 Lead the cable through the cable duct beneath the X-bay, and draw it through the opening below the Optibo board on the left side of the instrument.

Figure 6-118 Laying the X-flat cable



10 Connect the X-flat cable to socket J6 on the Optibo board.

Figure 6-119 Connection of X-flex cable to Optibo board

Finishing the Installation

1 Move the RoMa 2 several times back and forth and check whether the cable:
   - is not overstretched in any position
   - does not tilt to one side or the other
   - does not get entangled with other parts
   - just touches the right side wall when you move the RoMa 2 to the right side.

2 Ensure operating readiness according to Section 6.8.15.

3 Reinstall the X-bay covers and close the left access door when finished.

6.8.8 Gripper/Rotator Flex Cables

The gripper/rotator flex cables are two parallel cables – for the rotator motor and for the gripper motor – which are connected to the RoMa backplane and to the gripper board.

Removal

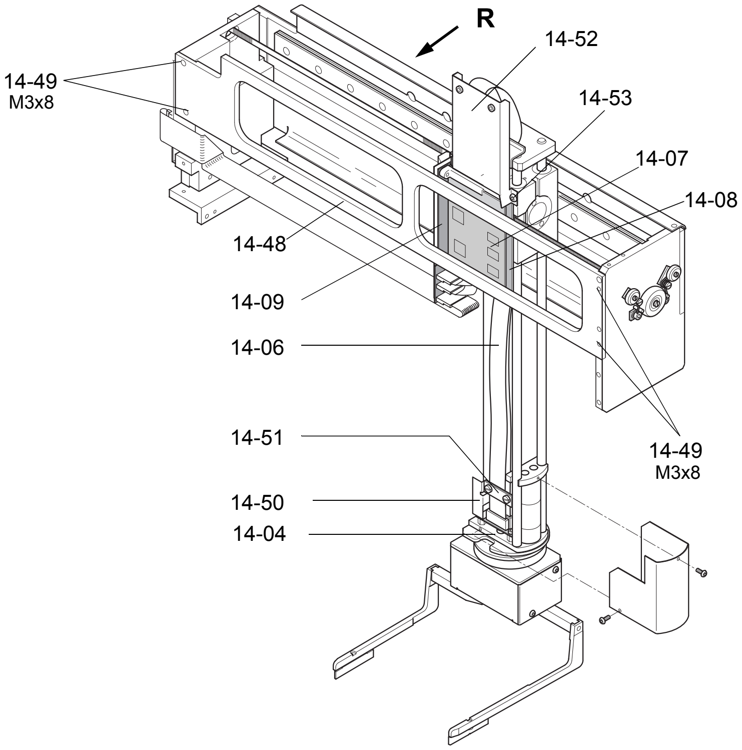


Figure 6-120 Gripper/Rotator flex cables

14-04	Gripper board	14-06	Gripper/Rotator flex cables
14-07	Z/G-DC-Servo board	14-08	Y/R-DC-Servo board
14-09	RoMa backplane	14-48	Left side plate
14-49	Screws	14-50	Cable bracket
14-51	Cable clamp	14-52	Protection bracket
14-53	Teflon foil		

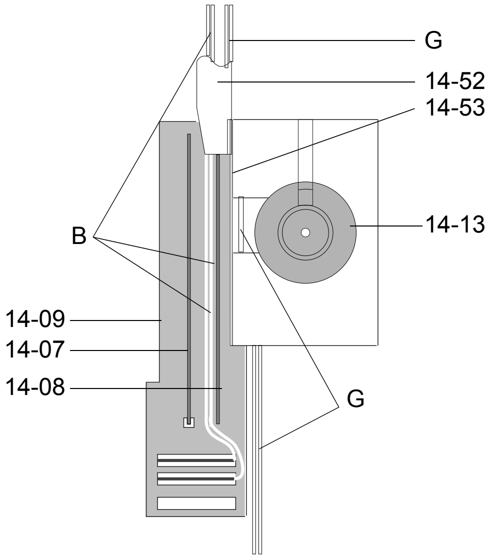
1. Lay the RoMa 2 with its right side down (R in Figure 6-120) on a flat, stable surface.
2. Remove left side cover (14-22, see Figure 6-112, ‘Removing the covers’).
3. Loosen the screws (14-49) and remove the left side plate (14-48).
4. Remove various cable clamps (14-51).
5. Unscrew and remove the cable bracket (14-50) and the protection bracket (14-52).
6. Remove the Z/G- and Y/R-DC-Servo boards (14-07) and (14-08).
   Details see Section 6.8.9, ‘Y/R- and Z/G-DC-Servo Board’.
7. Disconnect the respective gripper/rotator flex cable (14-06) from the RoMa 2 backplane (14-09) and the gripper board (14-04).

Installation

1 Fold the replacement gripper/rotator flex cable according to the cable you have removed.

2 Install in reverse order:

Insert the gripper/rotator flex cable properly according to Figure 6-121.



14-07	Z/G-DC-Servo board (address #7)
14-08	Y/R-DC-Servo board (address #6)
14-09	RoMa 2 backplane
14-13	Z-brake
14-52	Protection bracket
14-53	Teflon foil
B	Parts of gripper/rotator flex cables connected to backplane
G	Parts connected to gripper board.

Figure 6-121 Proper laying of the gripper/rotator flex cables

- Insert the gripper/rotator flex cable as shown in Figure 6-121:

  The parts (G) that plug into the gripper board must be arranged behind the Teflon foil (14-53).

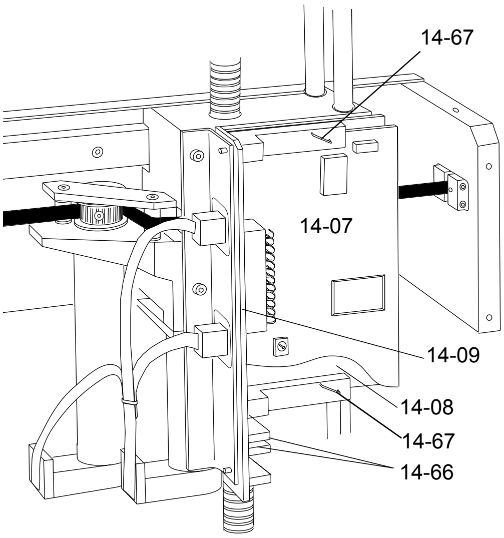
  The parts (B) that plug into the RoMa 2 must be drawn through the space between the Z/G- and Y/R-DC-Servo boards.

- Correct connection of the gripper/rotator flex cables:
  Gripper board J3 ⇨ RoMa 2 backplane: ST5
  Gripper board J4 ⇨ RoMa 2 backplane: ST6

3 Ensure operating readiness according to Section 6.8.15.

6.8.9 Y/R- and Z/G-DC-Servo Board

Overview



14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board
14-09	RoMa 2 backplane
14-66	Connectors for gripper/rotator flex cables
14-67	Board retaining clamps

Figure 6-122 DC-Servo boards

Tip: you may remove the left side plate (14-48, see Figure 6-120) to ease access.

ATTENTION

Be careful not to damage the gripper/rotator flex cables when you remove the boards.

Removing the Z/G-DC Servo Board

1 Shift the retaining clamp (14-67).

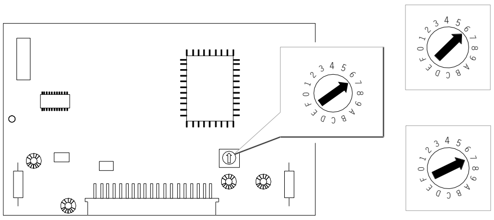
2 Carefully remove the Z/G-DC-Servo board (14-07).

Removing the Y/R-DC-Servo Board

3 Shift the retaining clamp (14-67).

4 Carefully remove the Y/R-DC-Servo board (14-08).

Installing the Boards



1 Make sure the address switches are set correctly:

- Switch on Y/R-DC-Servo board (14-08, inner board): address #6.
- Switch on Z/G-DC-Servo board (14-07, outer board): address #7.

Figure 6-123 Addresses on DC-Servo motor boards

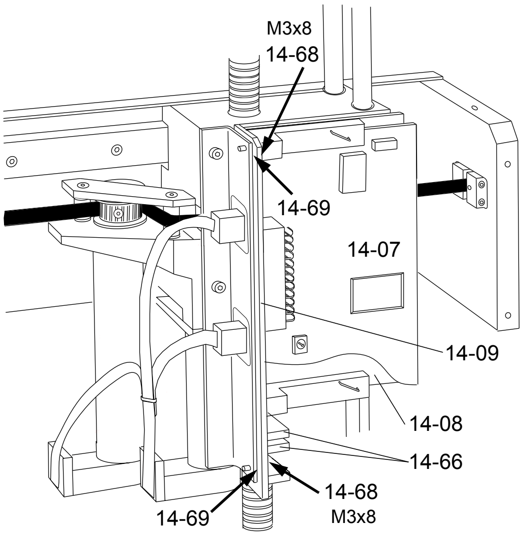
2 Install in reverse order.

3 Ensure operating readiness according to Section 6.8.15.

6.8.10 RoMa 2 Backplane

Removal

1. Remove the left side plate *(14-48, see Figure 6-120)*.
2. Disconnect all cables from the RoMa 2 backplane (14-09).
3. Remove the Z/G- and Y/R-DC-Servo boards (14-07) and (14-08) according to Section 6.8.9.
4. Loosen the fixing screws (14-68) and remove the RoMa 2 backplane (14-09).


M3x8
14-68
14-69
14-07
14-09
14-08
14-66
14-68
M3x8
14-69

14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board
14-09	RoMa 2 backplane
14-66	Connectors for gripper/rotator flex cables
14-68	Fixing screws
14-69	Spacer

Figure 6-124 Servo motor boards

Installation

1. Execute the above steps in reverse order.
   - Refer to Figure 6-125 for correct connections to the RoMa 2 backplane.

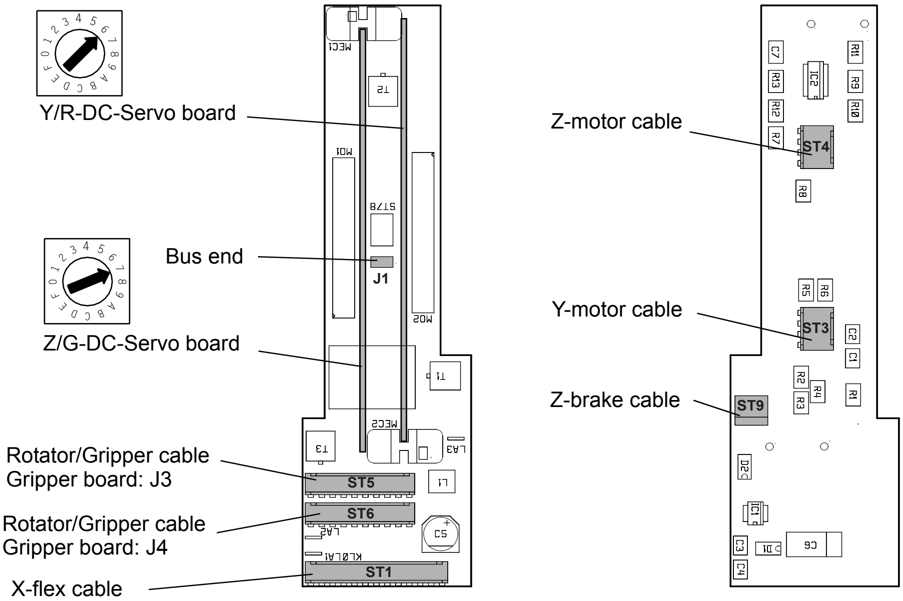

Y/R-DC-Servo board
Bus end
J1
Z/G-DC-Servo board
Rotator/Gripper cable
Gripper board: J3
Rotator/Gripper cable
Gripper board: J4
X-flex cable
ST5
ST6
ST1
Z-motor cable
ST4
Y-motor cable
ST3
Z-brake cable
ST9

Figure 6-125 RoMa 2 backplane connections (component side: left, solder side: right)

2. Ensure operating readiness according to Section 6.8.15.

6.8.11 Y-Belt

Removal

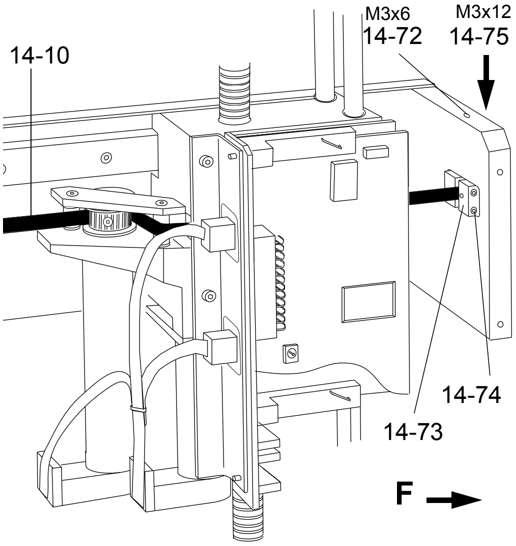


Figure 6-126 Y-belt (at front)

14-10	Y-belt
14-72	Set screw
14-73	Belt lock
14-74	Belt fixing screw
14-75	Belt tensioning screw (not directly visible)
F	Front

1 Loosen the screw (14-72).

2 Remove screw (14-75) and belt lock (14-73).

3 Loosen the screws (14-74) and remove the front end of the Y-belt.

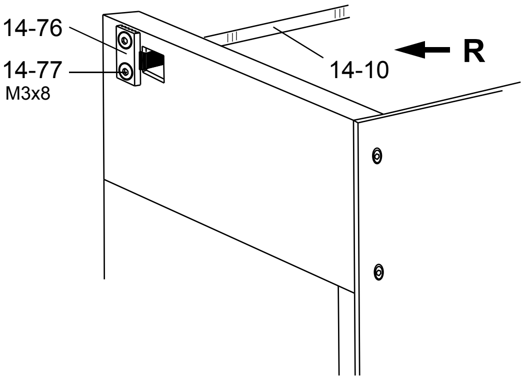


Figure 6-127 Y-belt (at the rear)

14-10	Y-belt
14-76	Fixing plate
14-77	Fixing screw
R	Rear side

4 Loosen the screws (14-77) at the rear until you can remove the rear end of the Y-belt (14-10).

5 Pull out the Y-belt.

Installation

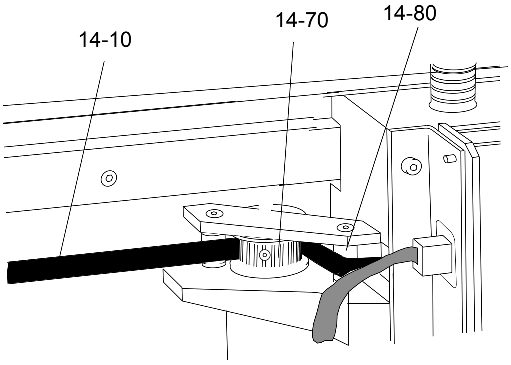


Figure 6-128 Threading in the Y-belt

14-10	Y-belt
14-70	Y-pulley
14-80	Deflection roller

1 Thread the Y-belt (14-10) past the deflection rollers (14-80) and the Y-pulley (14-70) as shown in Figure 6-128.

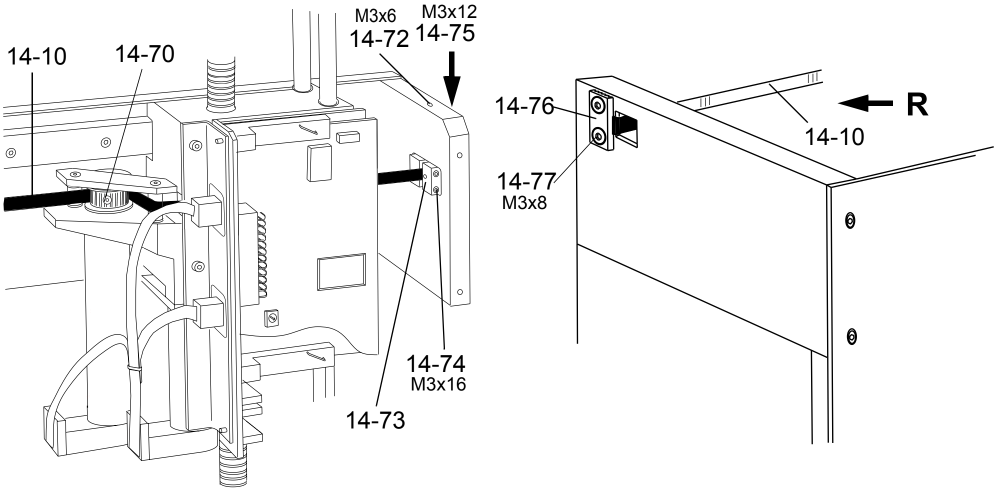


Figure 6-129 Fixing the Y-belt at the front and the rear

14-10	Y-belt	14-72	Set screw
14-73	Y-belt lock	14-74	Fixing screws
14-75	Belt tensioning screw	14-76	Fixing plate at rear
14-77	Fixing screw		

2 Fix the Y-belt (14-10) at the rear as shown on the right side of Figure 6-129.

3 Fix the Y-belt at the front as shown on the left side of Figure 6-129.

4 Tension the Y-belt by turning the screw (14-75, not visible in Figure 6-129).

5 Secure with set screw (14-72) when finished.

6 Move the assembly several times back and forth to check:

- if it moves properly
- if the belt tension is correct (belt must not slip over a tooth—but do not overtighten).

7 Ensure operating readiness according to Section 6.8.15.

6.8.12 Y-Motor

Removal

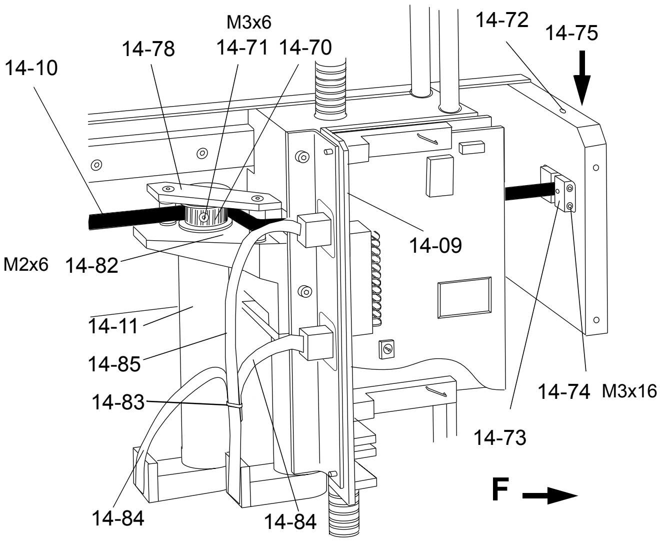


Figure 6-130 Y-motor

14-09	RoMa 2 backplane	14-10	Y-belt
14-11	Y-motor	14-70	Y-pulley
14-71	Set screw	14-72	Y-belt lock fixing screw
14-73	Belt lock	14-74	Fixing screws
14-75	Belt tensioning screw (not visible)	14-78	Mounting plate
14-82	Y-motor fixing screws	14-83	Cable tie
14-84	Y-motor cable	14-85	Z-motor cable
F	Front		

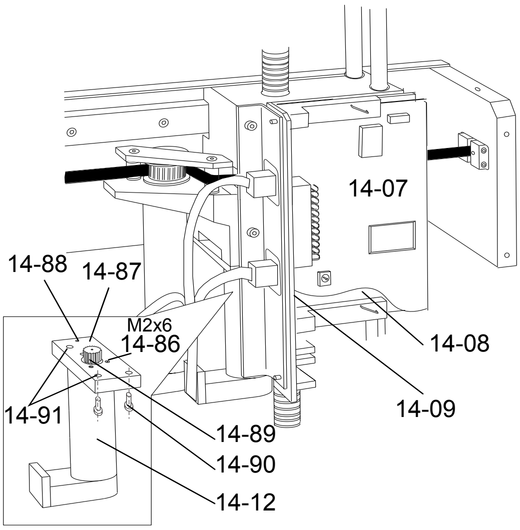
1. Cut the cable tie (14-83) and disconnect the motor cables (14-84) and (14-85) from the RoMa 2 backplane (14-09).
2. Loosen the screws (14-72) and (14-75) until the screws (14-74) become accessible. This releases the belt tension.
3. Unscrew the mounting plate (14-78) and remove the Y-pulley (14-70). Also see Section 6.8.11 for details.
4. Unscrew and remove the Y-motor (14-11).

Installation

1. Execute the above steps in reverse order.
2. Ensure operating readiness according to Section 6.8.15.

6.8.13 Z-Motor

Removal



14-07	Z/G-DC-Servo board
14-08	Y/R-DC-Servo board
14-09	RoMa 2 backplane
14-12	Z-motor
14-86	Fixing screws
14-87	Z-motor support
14-88	Positioning hole
14-89	Z-motor pinion
14-90	Fixing screws
14-91	Mounting holes

Figure 6-131 Removing the Z-DC motor

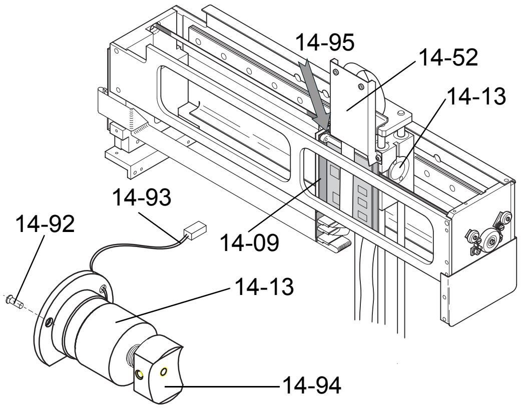
1. Remove the Z/G- and Y/R-DC-Servo boards (14-07) and (14-08) according to Section 6.8.9.
2. Remove the RoMa 2 backplane according to Section 6.8.10.
3. Unscrew and remove the Z-motor assembly.
4. Remove the Z-motor.

Installation

1. Execute the above steps in reverse order.
2. Ensure operating readiness according to Section 6.8.15.

6.8.14 Z-Brake

Removal



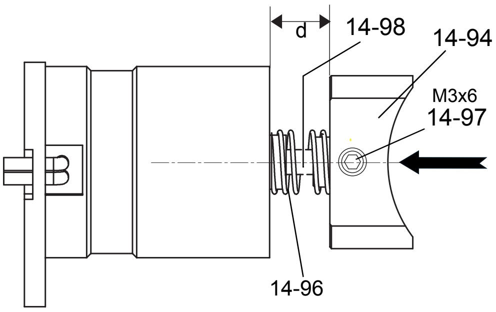
14-09	RoMa 2 backplane
14-13	Z-brake
14-52	Gripper/Rotator flex cable protection
14-92	Fixing screw
14-93	Z-brake cable
14-94	Brake shoe
14-95	Strain relief

Figure 6-132 Z-brake

1 Disconnect the Z-brake cable (14-93) from the RoMa 2 backplane (14-09). The cable is held by the strain relief (14-95) near the gripper/rotator flex cable protection (14-52).

2 Unscrew and remove the Z-brake (14-13).

Installation



14-94	Brake shoe
14-96	Pressure spring
14-97	Set screw
14-98	Threaded axle

Note that the brake shoe (14-94) is screwed to the axle (14-98) and fixed with the set screw 14-97.

Figure 6-133 Checking/adjusting the distance d

1 Press the brake shoe (14-94) in the direction of the black arrow until the stop.

2 Check the distance d (= 7.25 mm ± 0.2 mm). Adjust it if necessary:

- Loosen the set screw (14-97).
- Hold the axle (14-98) with a pair of pliers and turn the brake shoe (14-94) until the distance is correct.

3 Fasten the set screw (14-97) when finished.

4 Install the Z-brake (14-13) in reverse order.

- Make sure the parts of the Z-brake cable (14-93) which are covered with shrinkable tubing are fixed well with the cable clamps (see Figure 6-134, ‘Fixation of Z-brake cable’).

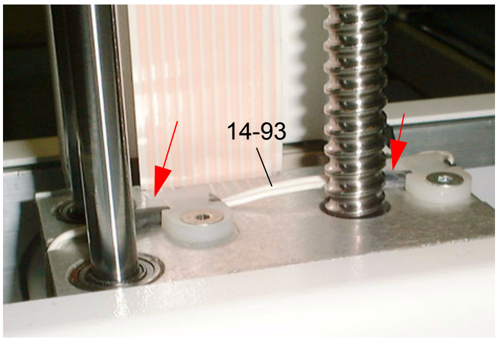


Figure 6-134 Fixation of Z-brake cable

- Refer to Figure 6-125, 'RoMa 2 backplane connections (component side: left, solder side: right)' for connection of the Z-brake cable to the RoMa 2 backplane.

5 Ensure operating readiness according to Section 6.8.15.

6.8.15 Ensuring Operating Readiness

Purpose

Most of the procedures described in this section require you to remove the entire RoMa before you can replace a damaged part. For this reason the adjustments and tests described below must be carried out after reinstallation.

Required Special Tools

- Reference tip
- RoMa test plate

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing most parts of the RoMa 2, verify – and if necessary carry out – the following settings and tests

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3) *Necessary if entire RoMa or backplane or X-flex cable were replaced.*
2	RoMa reference positions *Note: It may be necessary to check and readjust the taught positions in the application software as well.*
3	RoMa test
4	Random move *Attention: never perform a random move test with a Genesis RMP!*

After Finishing

1. Reinstall all covers you have removed.
2. Close service doors and X-bay covers.
3. Put objects you removed before back on the worktable
4. Start the Instrument in operating mode.

6.9 PosID 1 – Disassembly and Assembly Procedures

Supplied until October 1997.

In some other documents, the PosID 1 might be designated as PosID.

WARNING

Laser light of Laser Class 2. Avoid exposure. Do not stare into the beam.
Might be harmful for your eyes.

When servicing devices containing a laser, always switch off the instrument first.

Spare Parts PosID 1

For spare parts list with part numbers refer to Section 7.7, ‘Spare Parts PosID 1’.

Following items can be replaced as spare parts:

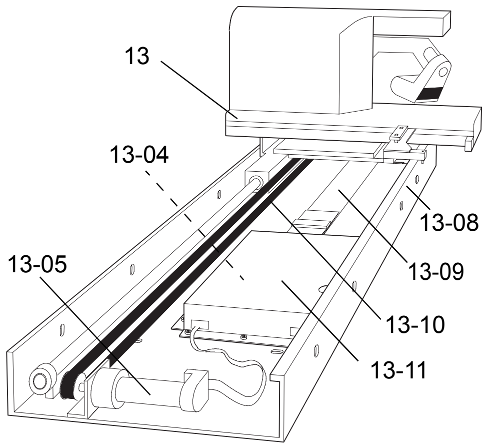
- X-belt (3.7 m)
- X-DC-Servo motor
- X-flex cable
- X-DC-Servo board
- PosID 1 CU board
- Y/B-DC-Servo board
- Y/B board
- Scanner head
- B-DC-Servo motor
- Y-belt
- Y-DC-Servo motor
- No tube sensor

6.9.1 Complete PosID 1 Assembly

The removing and installation procedure of the PosID 1 assembly is identical with the procedure for the PosID 2.

1 Please follow the descriptions given in Section 6.10.1, ‘Complete PosID 2 Assembly’.

2 Ensure Operating Readiness as described in Section 6.9.7.



13	PosID 1 module
13-04	PosID 1 CU board (hooded)
13-05	X-motor
13-08	Base plate
13-09	X-flex cable
13-10	X-belt
13-11	Cover

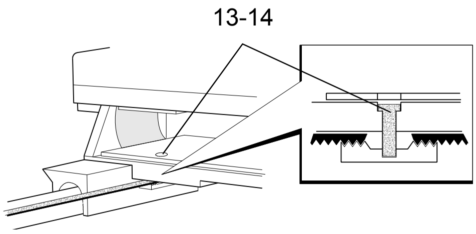
Figure 6-135 PosID 1 assembly

6.9.2 X-Drive Assembly (X-Belt, X-Motor, X-Flex Cable)

For X-DC-Servo board: see Section 6.9.3, 'Electronic Boards for PosID 1'.

X-Belt

Apart from a different design of the X-belt fixture (Figure 6-136), the removing and installation procedure of the PosID 1 X-belt is identical with the procedure for the PosID 2.



1 Please follow the descriptions given for the PosID 2 in Section 6.10.2, 'X-Drive Assembly (X-Belt, X-Motor, X-Flex Cable)'.

13-14	X-belt fixing screw

Figure 6-136 X-belt fixture for PosID 1

2 Ensure Operating Readiness as described in Section 6.9.7.

X-Motor

The removing and installation procedure of the PosID 1 X-motor is identical with the procedure for the PosID 2.

1 Please follow the descriptions given for the PosID 2 in Section 6.10.2, 'X-Drive Assembly (X-Belt, X-Motor, X-Flex Cable)'.

2 Ensure Operating Readiness as described in Section 6.9.7.

X-Flex Cable

STOP

ATTENTION

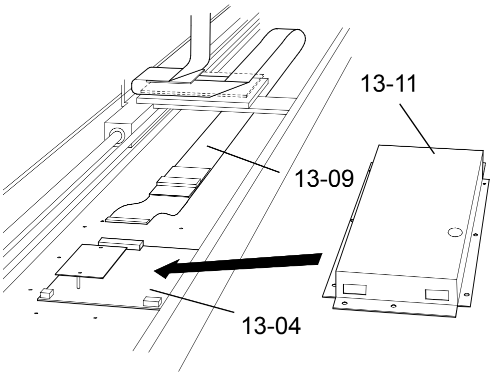
The replacement X-flex cable for PosID 1 is shipped correctly folded. Do not attempt to refold it in any other manner, as this will damage the flex cable.

Removal

1 Remove the worktable (see Section 6.3.1, ‘Worktable’).

2 Disconnect communication cable and x-motor cable from PosID 1 CU board (13-04).

3 Remove cover (13-11) and disconnect X-flex cable (13-09) from PosID 1 CU board.



4 Open and remove all flex cable fixtures.

5 Remove casing (see Figure 6-139, ‘Casing fixing screws’).

6 Disconnect the X-flex cable (13-09) from Y/B board (see Figure 6-140).

13-04	PosID 1 CU board
13-09	X-flex cable
13-11	Cover

Figure 6-137 X-flex cable assembly

Installation

1 Install in reverse order. Before installing the worktable …
   - check for correct movement of the X-flex cable, adjust if necessary.

2 Ensure Operating Readiness as described in Section 6.9.7.

6.9.3 Electronic Boards for PosID 1

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

PosID 1 CU Board, X-DC-Servo Board

The X-DC-Servo board is fixed to the PosID 1 CU board.

Removal

The item numbers mentioned refer to Figure 6-137, ‘X-flex cable assembly’.

1 Remove the worktable (see Section 6.3.1, ‘Worktable’).

2 Remove cover (13-11) and disconnect all cables from the PosID 1 CU board (13-04).

3 Unscrew and remove X-DC-Servo board.

4 Unscrew the PosID 1 CU board.

5 Use chip pliers to remove the Serial EEPROM (IC7).

Use of EEPROM from the replaced CU board ⇨ an error might be carried forward.

Use of new EEPROM ⇨ you loose all settings.

Installation

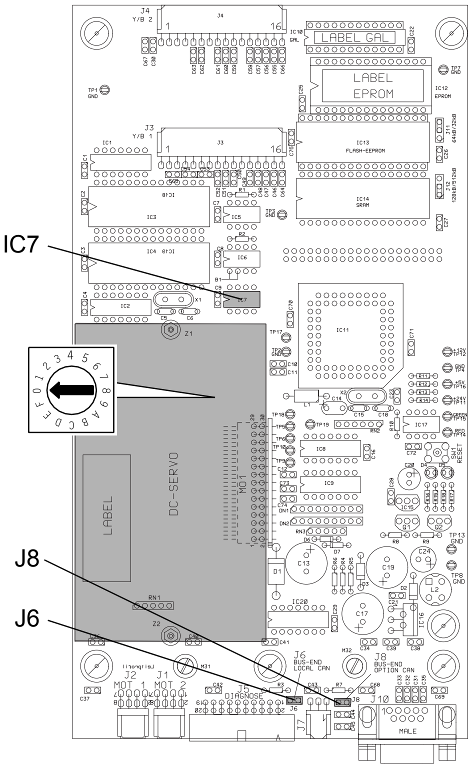


Figure 6-138 PosID 1 CU board

1. Make sure the jumper J6 is set.
2. Control if jumper J8 has been set correctly according the configuration of the instrument (see ‘Communication Overview’ in Section 6.2.2, ‘Jumper and Address Settings Overview’).
3. X-DC-Servo board: check if address switch is set to #0.
4. Install in reverse order.
5. Ensure Operating Readiness as described in Section 6.9.7.

Y/B Board, Y/B-DC-Servo Board

The Y/B-DC-Servo board is fixed to the Y/B board.

Removal

The item numbers mentioned refer to Figure 6-140, ‘Y/B board’.

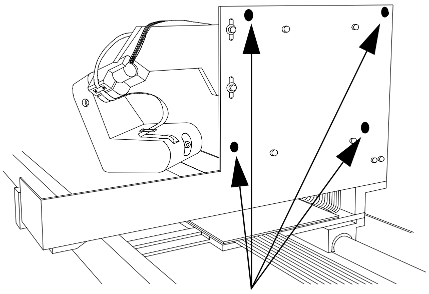


Figure 6-139 Casing fixing screws

1. Remove casing (13-15).
2. Unscrew and remove Y/B-DC-Servo board (13-16).
3. Disconnect all cables from Y/B board (13-17).
4. Unscrew and remove Y/B board.

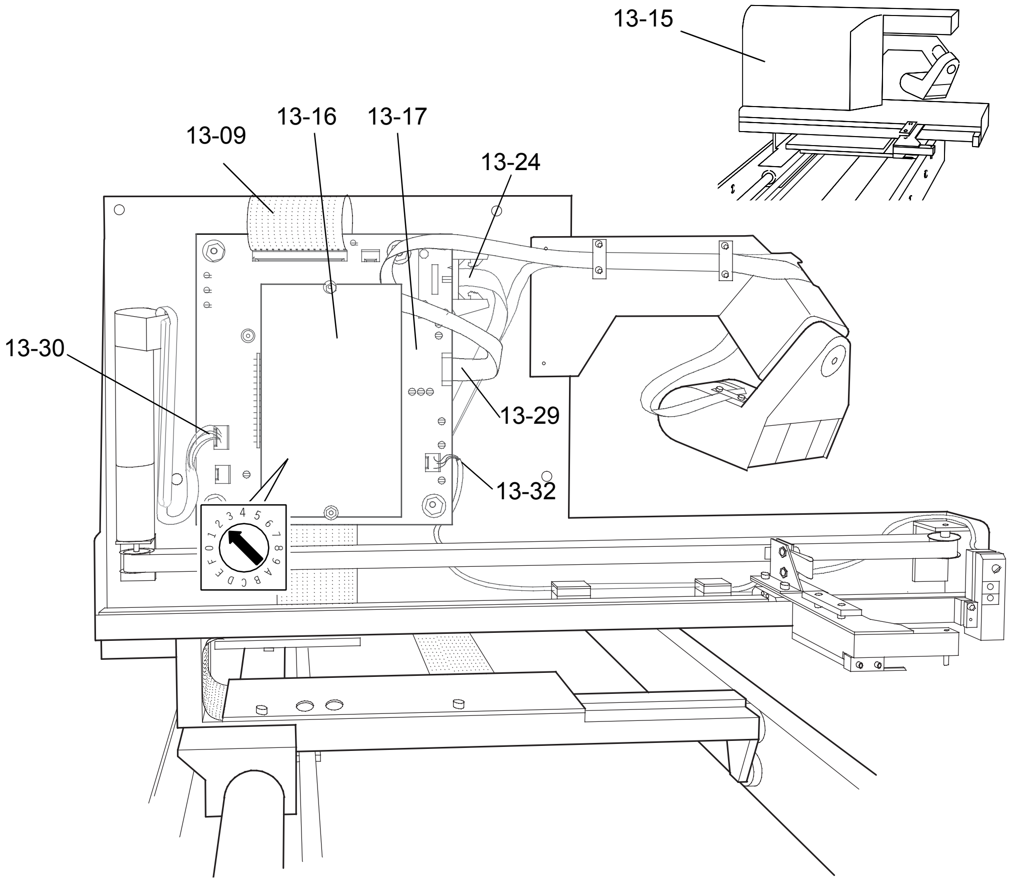


Figure 6-140 Y/B board

13-09	X-flex cable	13-24	B-motor cable
13-15	Casing	13-29	Scanner flex cable
13-16	Y/B-DC-Servo board	13-30	Y-motor cable
13-17	Y/B board	13-32	No tube sensor cable

Installation

1 Install in reverse order.

- Y/B-DC-Servo board: check if address switch is set to #2.
- Do not forget the insulation washers between screws and Y/B-DC-Servo board. Do not over-tighten the screws.
- Before mounting the Y/B board, check if the X-flex cable is correctly installed.
- Refer to Figure 6-140 for correct cable connection.

2 Ensure Operating Readiness as described in Section 6.9.7.

6.9.4 Scanner Assembly (Scanner Head, B-Motor)

Scanner Head

In some other documents, the scanner head might be referred to as barcode reader head.

Removal

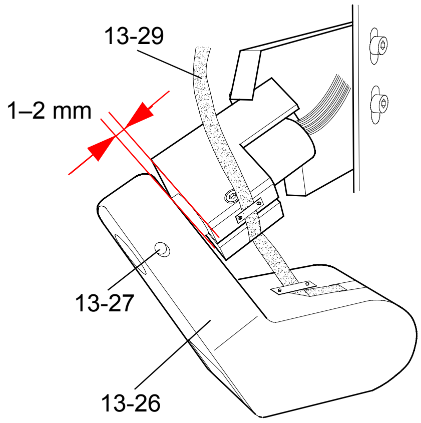


Figure 6-141 Scanner head

1. Remove casing (13-15) (see Figure 6-139, ‘Casing fixing screws’).
2. Disconnect scanner flex cable (13-29) from Y/B board and remove flex cable holders.
3. Open set screw (13-27) and remove scanner head (13-26).

13-26	Scanner head
13-27	Set screw
13-29	Scanner flex cable

Installation

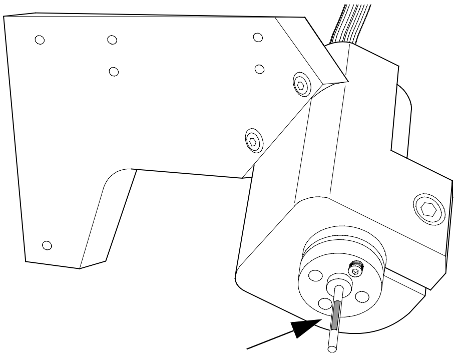


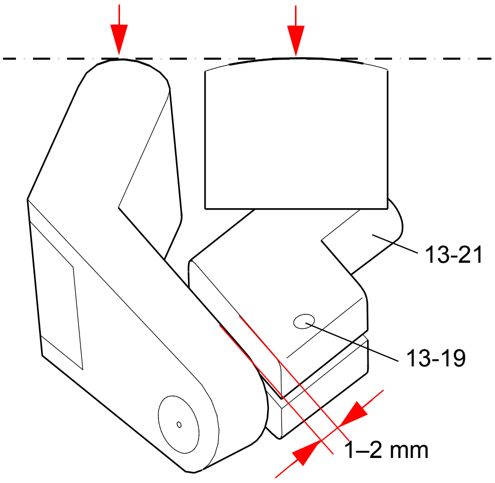
Figure 6-142 Installation of scanner head

1. Manually rotate the B-motor axle that the flat part points towards the front of the instrument (indicated with an arrow in Figure 6-142).
2. Place the scanner head over the axle.
   - Adjust the distance between support and scanner head to 1–2 mm max. (Figure 6-141).
   - When fixing, make sure the set screw (13-27) is perpendicular to the flat part of the axle.
3. Connect the scanner flex cable to the Y/B board (see Figure 6-140, ‘Y/B board’) and install the cable fixtures.

   When inserting the cable into flex cable plug (J6), make sure the side with visible contacts is facing the board.
4. Install casing.
5. Ensure Operating Readiness as described in Section 6.9.7.

B-motor

Removal.



1. Remove scanner head as described earlier in this section.
2. Disconnect B-motor cable from Y/B board (see Section Figure 6-140, 'Y/B board')
3. Important for reinstallation: notice the correct positioning of the B-motor.
4. Loosen the fixing screw (13-19) and pull the B-motor (13-21) out of the support.

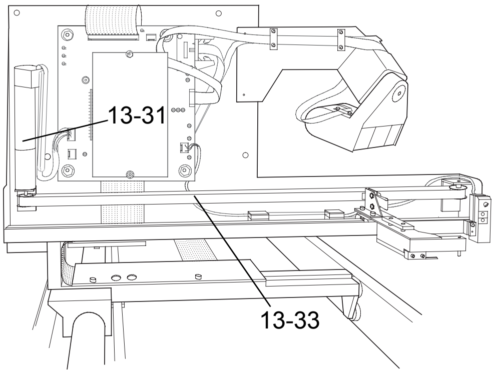
13-19	B-motor fixing screw
13-21	B-motor

Figure 6-143 B-motor and scanner head adjustment

Installation

1. Remove possibly present sticker(s) from the new motor body.
2. Insert the B-motor (13-21) into the support; pay attention to correct positioning.
3. Mount the casing but do not tighten the fixing screws yet.
4. Install scanner head as described earlier in this section.
5. Turn the scanner head clockwise as far as it will go. Check according to Figure 6-143 that the scanner head is not higher than the casing. If necessary, loosen the B-motor fixing screw (13-19) and adjust the scanner head accordingly.
6. Check correct distance (1–2 mm maximal) between scanner head and support; if needed loosen the scanner head set screw (13-27) and readjust (see Figure 6-141, 'Scanner head').
7. Remove casing and connect B-motor cable to the Y/B board (see Figure 6-140, 'Y/B board').
8. Install casing.
9. Ensure Operating Readiness as described in Section 6.9.7.

6.9.5 Y-Belt Assembly (Y-Belt, Y-Motor)



13-31	Y-motor
13-33	Y-belt

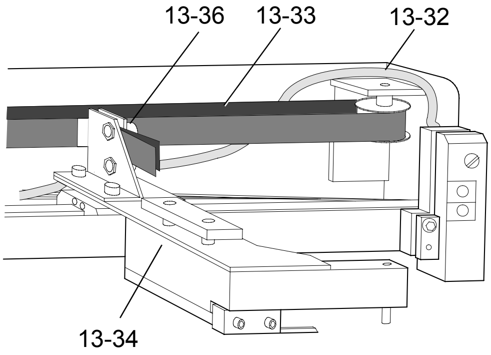
Figure 6-144 Y-belt assembly

Y-Belt (Gripper Belt)

Removal

1 Remove casing (13-15) (see Figure 6-139, ‘Casing fixing screws’).

2 Loosen the belt tensioning screws (13-36), remove Y-belt (13-33).



13-32	No tube sensor cable
13-33	Y-belt
13-34	Gripper assembly
13-36	Belt tensioning screw

Figure 6-145 Y-belt

Installation

1 Place the Y-belt (13-33) over the drive pulley and the idler pulley. Insert Y-belt into belt fixture as shown in Figure 6-145.

2 Make sure the belt ist exactly horizontal, strain it and tighten the belt tensioning screws (13-36).

3 Make sure that the no tube sensor cable (13-32) is placed correctly (see Figure 6-145).

4 Move the gripper assembly (13-34) back and forth; check if the belt runs precisely over the two pulleys.
If it moves (even slightly) up or down or slips off the pulley, adjust either at the belt fixture or the height of the drive pulley as described later in section Y-Motor (Gripper Motor).

5 Install casing.

6 Ensure Operating Readiness as described in Section 6.9.7.

Y-Motor (Gripper Motor)

Removal

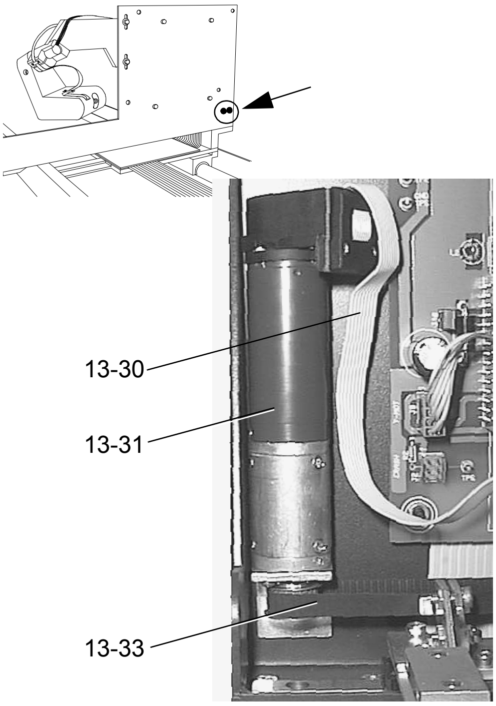


Figure 6-146 Y-motor assembly

1. Remove casing (13-15) (see Figure 6-139, 'Casing fixing screws').
2. Remove Y-belt (13-33) as described earlier in this section.
3. Disconnect Y-motor cable (13-30) from Y/B board.
4. Open Y-motor fixing screws (indicated with an arrow in Figure 6-146), remove Y-motor assembly.
5. Remove drive pulley (set screw) and bracket from Y-motor (13-31).

13-30	Y-motor cable
13-31	Y-motor
13-33	Y-belt

Installation

1. Install in revers order.
   - Note the correct orientation of the encoder head (see Figure 6-146).
   - When installing the drive pulley, adjust the clearance between pulley and bracket to approximately 3 mm.
   - Check if the belt runs precisely over the two pulleys.
     If it moves (even slightly) up or down or slips off the pulley, adjust the height of the drive pulley accordingly.
2. Ensure Operating Readiness as described in Section 6.9.7.

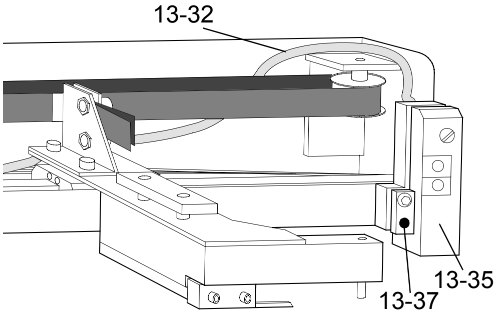
6.9.6 No Tube Sensor

Removal

The item numbers mentioned refer to Figure 6-147, 'No tube sensor'.

1. Remove casing (13-15) (see Figure 6-139, 'Casing fixing screws').
2. Disconnect no tube sensor cable (13-32) from Y/B board and free cable from holders.
3. Open the fixing screw (13-37), remove no tube sensor (13-35).

Installation



13-32	No tube sensor cable
13-35	No tube sensor
13-37	Fixing screw

Figure 6-147 No tube sensor

1 Install in revers order.

- When installing the no tube sensor cable (13-32), lead it according to Figure 6-147 over the idler pulley bracket and fix it with the cable holders.
  Check if neither y-belt nor gripper assembly – if moved back and forth – touch the no tube sensor cable.
- When connecting the no tube sensor cable to the Y/B board, tuck the redundant part of the cable behind the board (see Figure 6-140).

2 Ensure Operating Readiness as described in Section 6.9.7.

6.9.7 Ensure Operating Readiness

Required Special Tool

- PosID service rack (see Section 6.2.1, 'Special Tools')

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing any part of the PosID 1, control – and if necessary carry out – following settings:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	PosID test
3	PosID adjustment *Only necessary if PosID test failed*
4	Random move *Attention: never perform a random move test with a Genesis RMP!*

6.10 PosID 2 – Disassembly and Assembly Procedures

Supplied as of November 1997.

In some other documents, the PosID 2 might be referred to as PosID 2000.

Note

As of February 2001, the PosID 2 CU board – previously installed in the PosID 2 base plate – is located in the left service compartment.

WARNING

Laser light of Laser Class 2. Avoid exposure. Do not stare into the beam.
Might be harmful for your eyes.

When servicing devices containing a laser, always switch off the instrument first.

Spare Parts PosID 2

For spare parts list with part numbers refer to Section 7.8, ‘Spare Parts PosID 2’.

Following items can be replaced as spare parts:

- PosID 2 assembly
- X-belt (5 m)
- X-flex cable
- X-DC-Servo motor
- PosID 2 CU board
- X-DC-Servo board
- Y/B board
- Y/B-DC-Servo board
- DSP decoding board
- B-DC-Servo motor
- Scanner head
- Scanner cable
- Y-belt
- Gripper assembly
- Y-DC-Servo motor
- No tube sensor

6.10.1 Complete PosID 2 Assembly

Removal

1. Remove the worktable (see Section 6.3.1, ‘Worktable’).
2. Refer to Figure 6-148, ‘PosID 2 cable connections: new version (left) and older version (right)’:

   If PosID 2 CU board is located in the left service compartment (new version):

   - Disconnect the PosID 2 connection cable (13-03) and the X-motor cable (13-02) from the PosID 2 CU board.

   If the PosID 2 CU board is installed underneath the worktable (older version):

   - Disconnect the PosID 2 communication cable (13-01) from the Optibo.

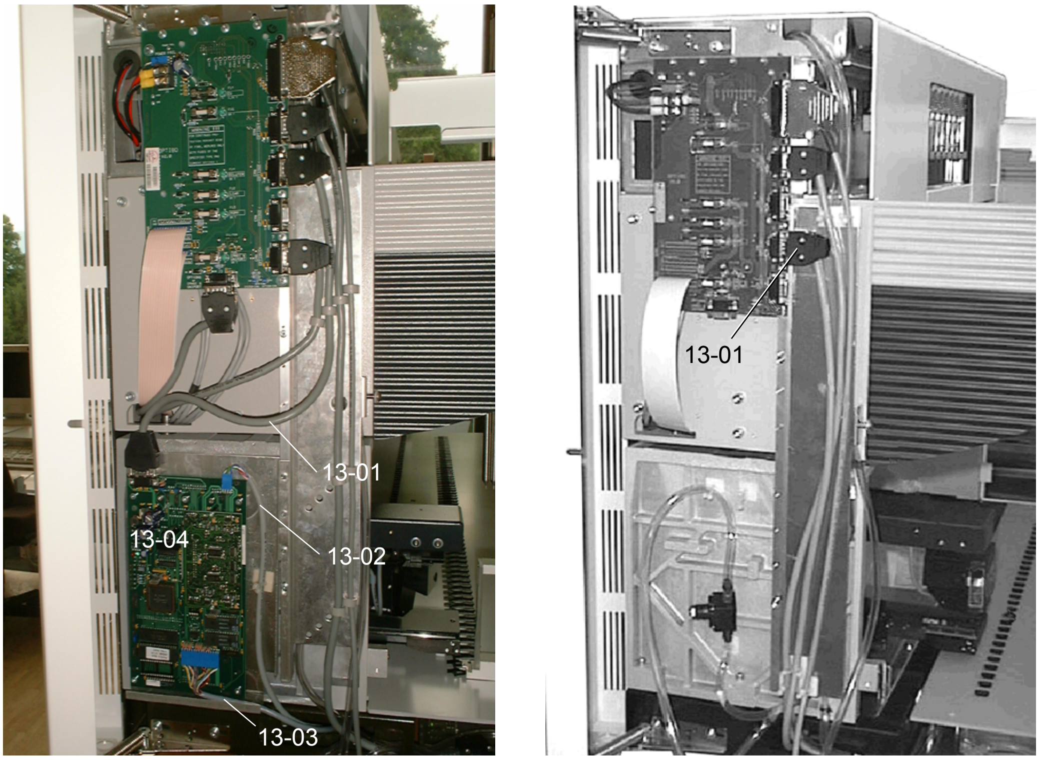


Figure 6-148 PosID 2 cable connections: new version (left) and older version (right)

13-01	Communication cable
13-02	X-motor cable
13-03	Connection cable
13-04	PosID 2 CU board

3. Remove the PosID 2 assembly fixing screws or fixing nuts.
4. Slide the PosID 2 module (13) to the left side.
5. Seize the assembly by the base plate (13-08), lift the right side first and then carefully lift the complete PosID 2 assembly out of the instrument.

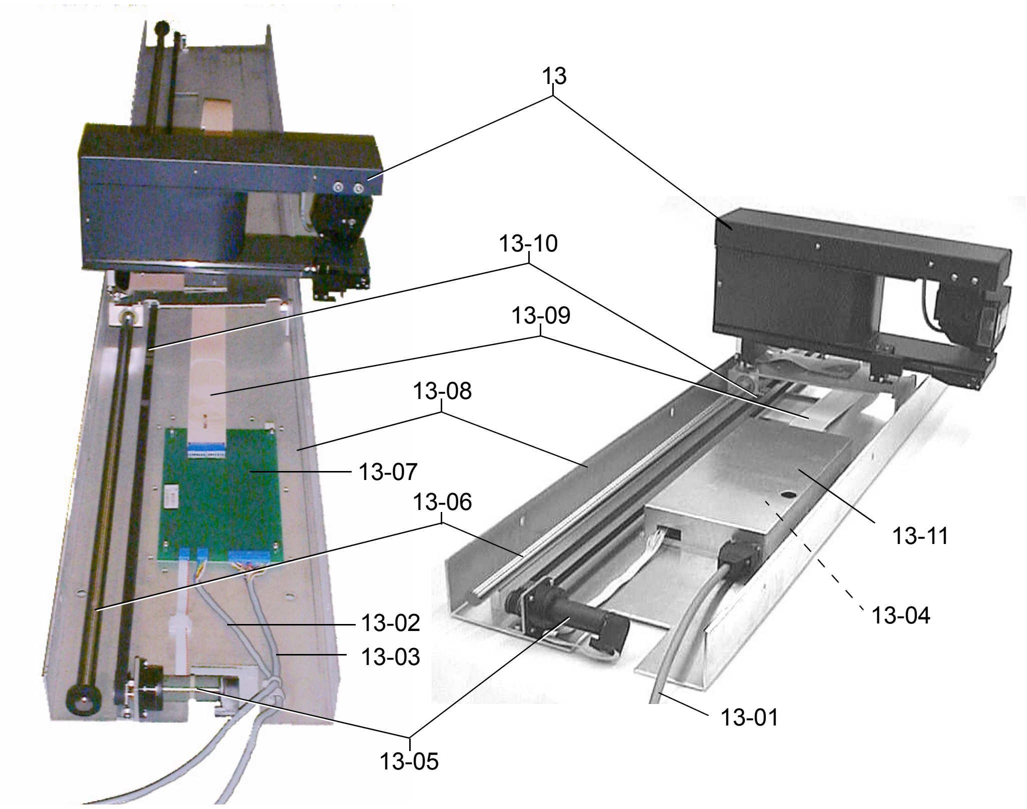


Figure 6-149 PosID 2 assembly: new version (left) and older version (right)

13	PosID 2 module	13-06	X-shaft
13-01	Communication cable	13-07	PosAda board
13-02	X-motor cable	13-08	Base plate
13-03	Connection cable	13-09	X-flex cable
13-04	PosID 2 CU board (hooded)	13-10	X-belt
13-05	X-motor	13-11	Cover

Installation

1 Install in reverse order.
Refer to Figure 6-150, 'Installation of PosID 2 assembly before and after May 2002':

- For PosID modules produced before May 2002 move the base plate (13-08) to the very left and very back of the instrument before screwing the base plate to the instrument frame.
- For PosID modules produced after May 2002 move the base plate (13-08) to the very left of the instrument and make sure that a space of 2 mm is left in front and behind the base plate before screwing it into the instrument frame.

2 Before installing the worktable …

- check for smooth an even motion of the PosID 2 module (13)
- check for correct movement of the X-flex cable (13-09)
- make sure that the X-shaft (13-06) and the base plate (13-08) are absolutely clean.

3 Ensure Operating Readiness as described in Section 6.10.7.

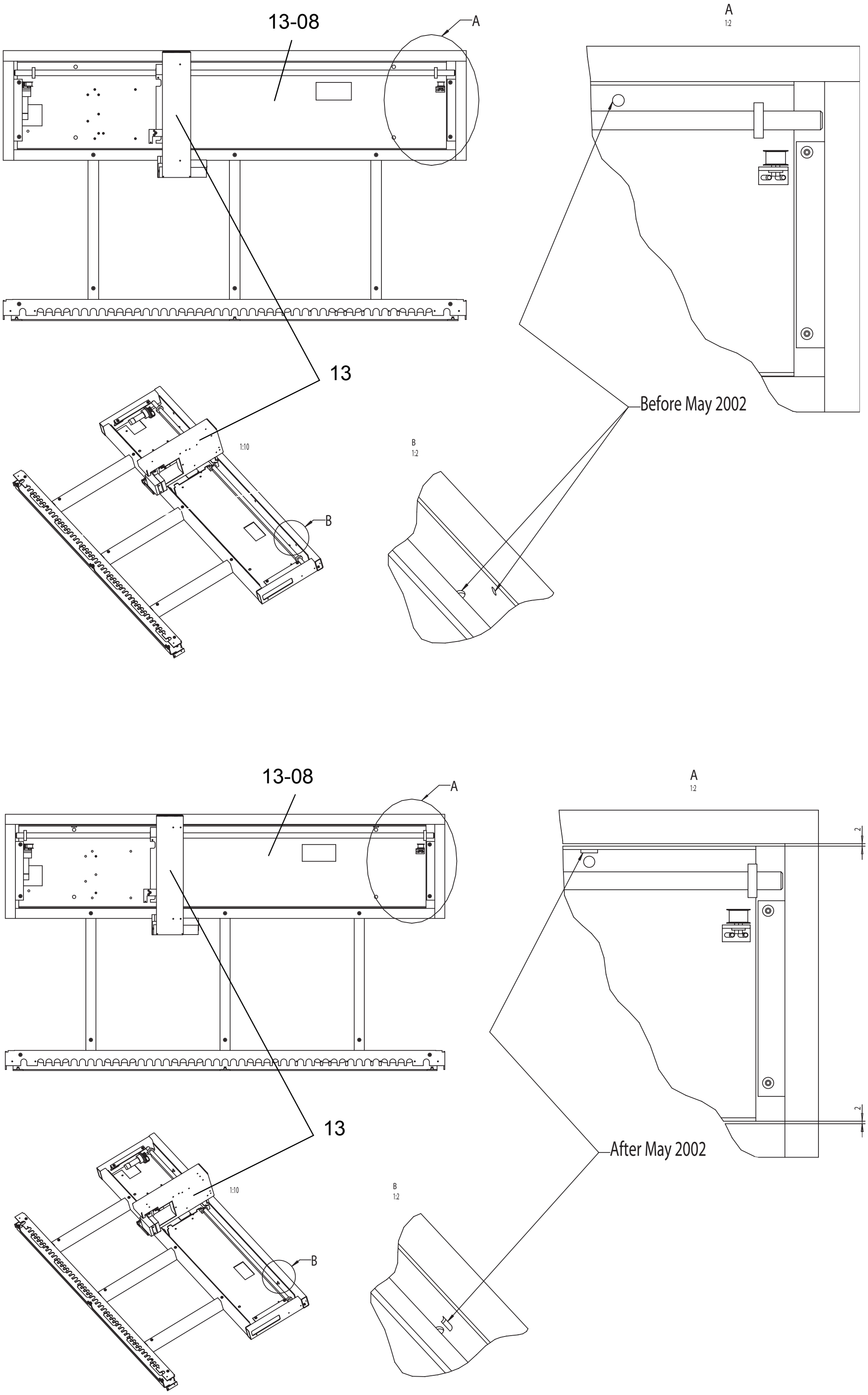

13-08
A
A
1:2
13
Before May 2002
1:10
B
B
1:2
13-08
A
A
1:2
2
2
13
After May 2002
1:10
B
B
1:2

Figure 6-150 Installation of PosID 2 assembly before and after May 2002

13	PosID 2 module
13-08	Base plate

6.10.2 X-Drive Assembly (X-Belt, X-Motor, X-Flex Cable)

For X-DC-Servo board: see Section 6.10.3, ‘Electronic Boards for PosID 2’.

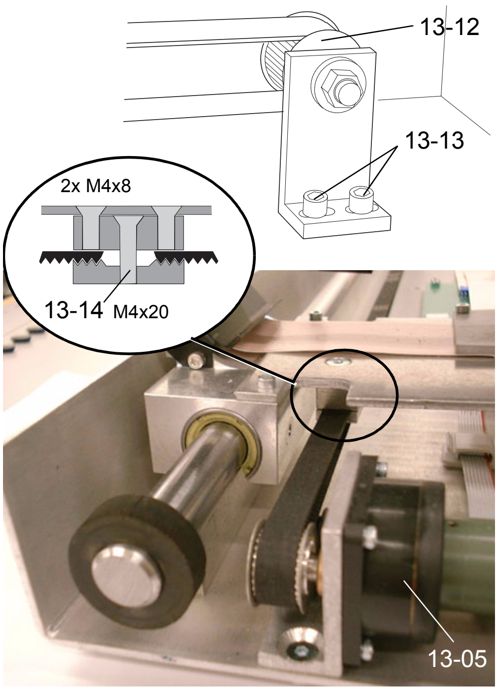
X-Belt

Removal

1. Remove the worktable (see Section 6.3.1, ‘Worktable’).
2. Loosen the belt tensioning screws (13-13).
3. Unscrew X-belt fixture to access the X-belt fixing screw (13-14).
4. Remove X-belt.

Installation

1. For a new belt: cut the X-belt to the required length:
   PosID 2/100: 1680 mm/66.4 inch
   PosID 2/150: 2430 mm/95.7 inch
   PosID 2/200: 3630 mm/142.9 inch
2. Run the X-belt over the idler pulley (13-12) and the drive pulley of the X-motor; insert belt ends into the fixture, tighten the fixing screw (13-14).
3. Fasten the X-belt fixture to the X-slide.
4. Adjust and tighten the tensioning screws (13-13): the belt must be tight and horizontal, but do not over-tighten.
5. Ensure Operating Readiness as described in Section 6.10.7.



13-05	X-motor
13-12	Idler pulley
13-13	Tensioning screws
13-14	X-belt fixing screw

Figure 6-151 X-drive assembly, details

X-Motor

Removal

1. Remove the worktable (see Section 6.3.1, ‘Worktable’).
2. Disconnect the X-motor cable from the PosAda board (13-07) for the new version or PosID 2 CU board (13-04) for the older version (see Figure 6-149, ‘PosID 2 assembly: new version (left) and older version (right)’.
3. Loosen the belt tensioning screws (13-13).
4. Remove pulley from X-motor assembly, unscrew X-motor (13-05) from bracket.

Installation

1 Install in reverse order.

- Adjust the distance between drive pulley and bracket to approx. 5.5 mm.

2 Ensure Operating Readiness as described in Section 6.10.7.

X-Flex Cable

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.
Wear a wrist strap.

Removal

1 Remove the worktable (see Section 6.3.1, ‘Worktable’).

2 Remove casing as shown in Figure 6-155, ‘Y/B board assembly’.

3 Refer to Figure 6-149, ‘PosID 2 assembly: new version (left) and older version (right)’:

- For new version: disconnect X-flex cable from PosAda board.
- For older version: disconnect communication cable and x-motor flex cable from PosID 2 CU board.
- Remove cover and disconnect X-flex cable from PosID 2 CU board.

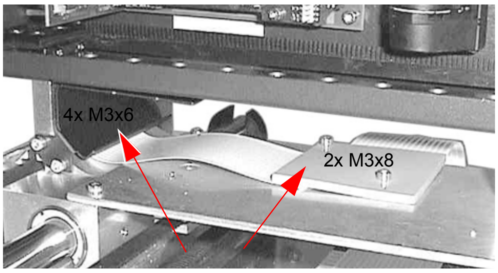


Figure 6-152 Flex cable fixtures

4 Remove the flex cable fixtures.

5 Unscrew the Y/B board fixing screws (see Figure 6-156) in order to free the X-flex cable.

6 Disconnect the X-flex cable from Y/B board.

Installation

Note

The X-flex cable is available in two length, for instruments size 100/150 and for instrument size 200.

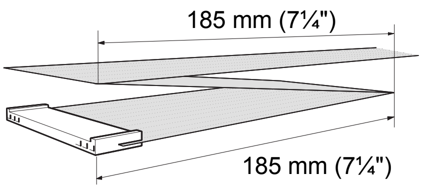


Figure 6-153 X-flex cable for instruments size 100

1 For instruments size 100, fold the X-flex cable according to figure Figure 6-153 –on the end where it will be connected to the PosAda (new version) or to the PosID2 CU board (older version).

2 Install in reverse order. Before installing the worktable …

- check for correct movement of the X-flex cable, adjust if necessary.

3 Ensure Operating Readiness as described in Section 6.10.7.

6.10.3 Electronic Boards for PosID 2

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices.
Wear a wrist strap.

PosID 2 CU Board, X-DC-Servo Board

Important

As of February 2001, the PosID 2 CU board – previously installed in the PosID 2 base plate – is located in the left service compartment.

The X-DC-Servo board is fixed to the PosID 2 CU board.

Removal

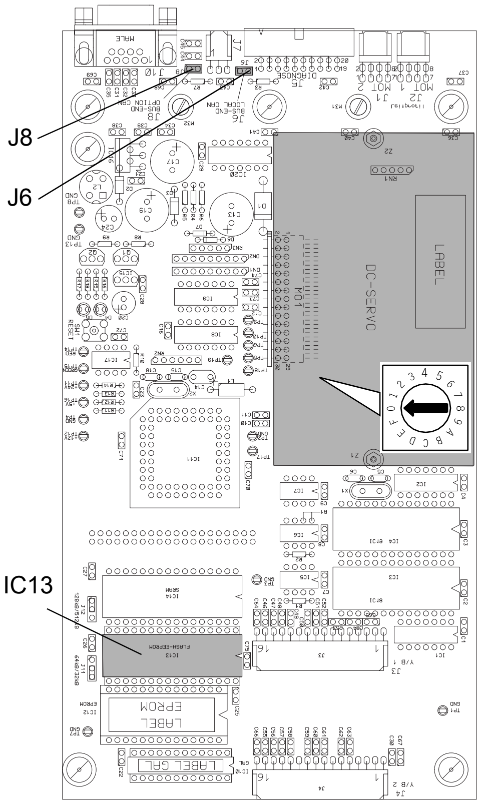


Figure 6-154 PosID 2 CU board

1 If CU board is located in the left service compartment:
   - Disconnect all cables from the PosID 2 CU board.

   If CU board is located in the base plate:
   - Remove the worktable (see Section 6.3.1, ‘Worktable’).
   - Remove cover and all cables from the PosID 2 CU board.
2 Unscrew and remove X-DC-Servo board.
3 Unscrew the PosID 2 CU board.
4 Use chip pliers to remove the Flash EEPROM (IC13) if you want to install it on the new board.

   Use of EEPROM from the replaced CU board ⇨ an error might be carried forward.

   Use of new EEPROM ⇨ you loose all settings.

Installation

1 Make sure the jumper J6 is set.
2 Control if jumper J8 has been set correctly according the configuration of the instrument (see ‘Communication Overview’ in Section 6.2.2, ‘Jumper and Address Settings Overview’).
3 X-DC-Servo board: check if address switch is set to #0.
4 Install in reverse order.
5 Ensure Operating Readiness as described in Section 6.10.7.

Y/B Board, Y/B-DC-Servo Board

Removal

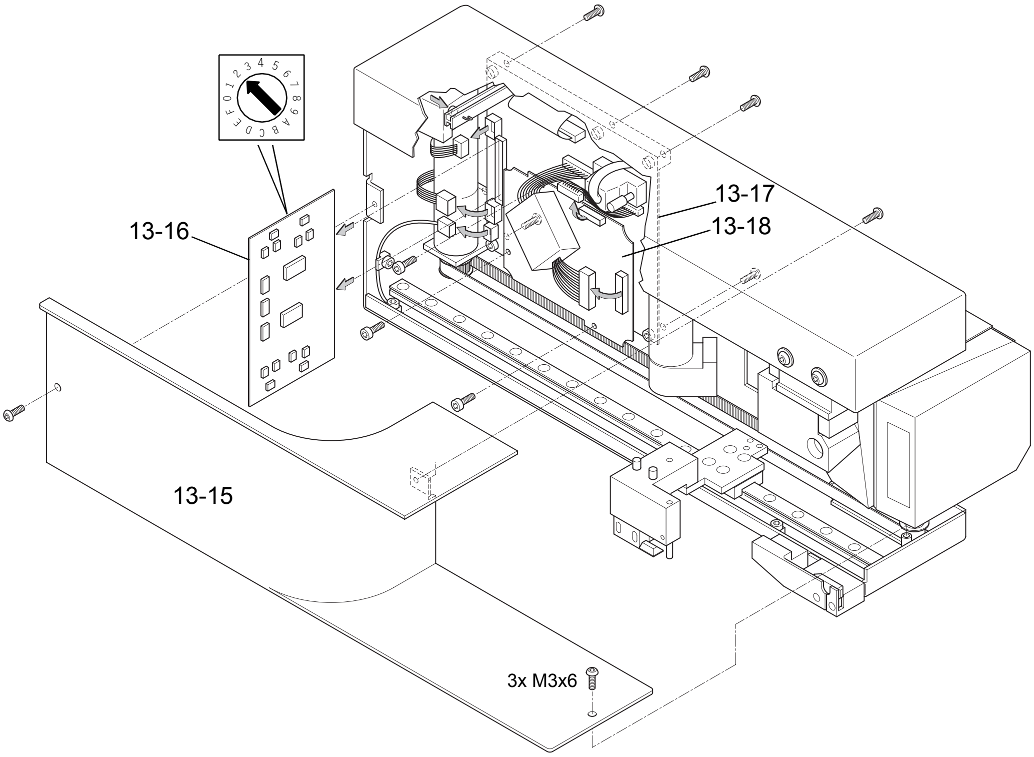


Figure 6-155 Y/B board assembly

13-15	Casing	13-17	Y/B board
13-16	Y/B-DC-Servo board	13-18	DSP decoding board

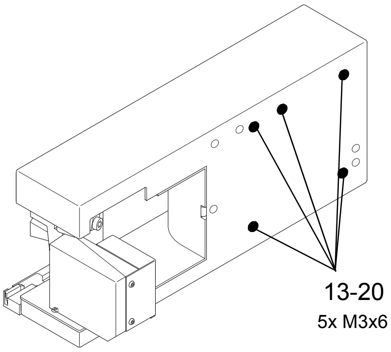


Figure 6-156 Y/B board fixing screws

13-20	Y/B board fixing screws

1 Remove casing (13-15).

2 Disconnect all cables from Y/B board (13-17).

3 On the exterior of the PosID 2, unscrew fixing screws (13-20) and remove Y/B board.

4 Remove Y/B-DC-Servo board (13-16).

5 Remove DSP decoding board (13-18).

Installation

1 Y/B-DC-Servo board: check if address switch is set to #2.

2 Install in reverse order.
Refer to Figure 6-157 for correct cable connection.

3 Ensure Operating Readiness as described in Section 6.10.7.

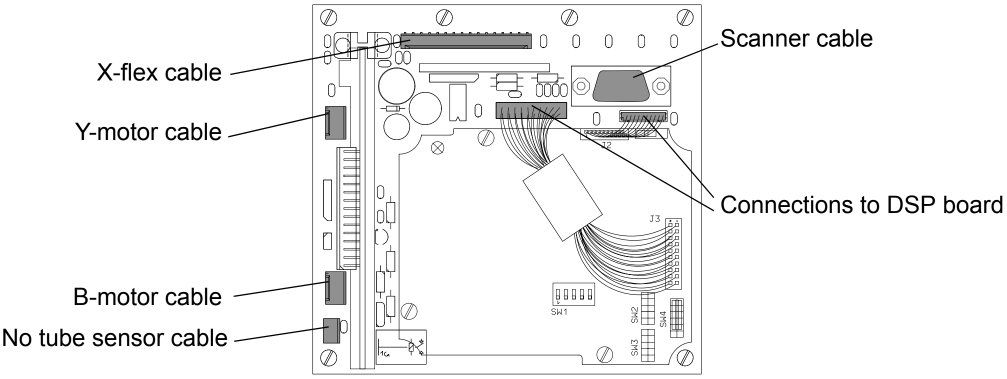


Figure 6-157 Y/B board cable connections

DSP Decoding Board

Removal

The item numbers mentioned refer to Figure 6-155, 'Y/B board assembly'.

1. Remove casing (13-15).
2. Disconnect cables from DSP decoding board (13-18).
3. Remove DSP decoding board.

Installation

1. Install in reverse order.
2. Ensure Operating Readiness as described in Section 6.10.7.

6.10.4 Scanner Assembly (B-Motor, Scanner Head and Cable)

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices. Wear a wrist strap.

B-Motor

Removal

The item numbers mentioned refer to Figure 6-158, 'B-motor'.

1. Remove casing (13-15) as shown in Figure 6-155, 'Y/B board assembly'.
2. On the exterior of the PosID 2, unscrew the Y/B board fixing screws (13-20) to free the B-motor cable (13-24); disconnect this cable from Y/B board.
3. On the exterior of the PosID 2, unscrew fixing screws (13-19) to remove the B-motor assembly.
4. Loosen the set screw (13-22), remove gearing assembly.
5. Remove bracket (13-23) from B-motor (13-21).

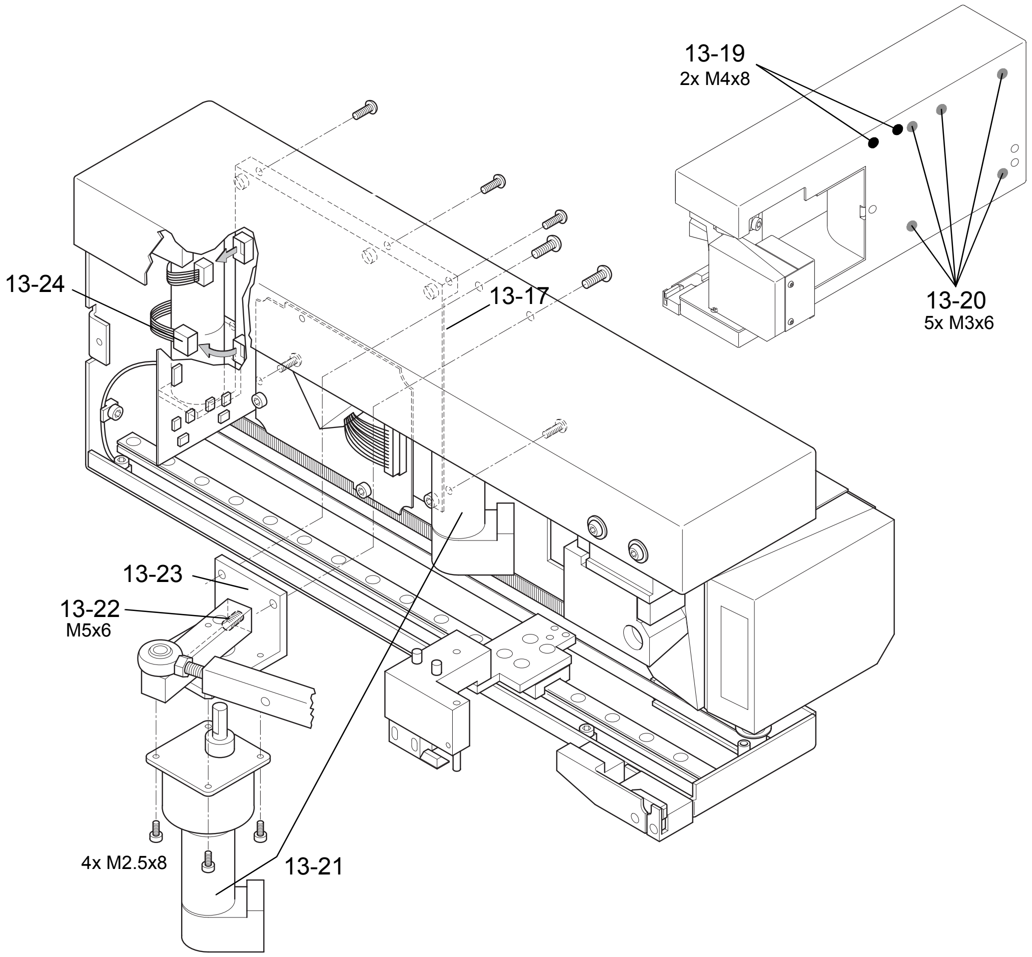


Figure 6-158 B-motor

13-17	Y/B board	13-22	Set screw
13-19	B-motor fixing screws	13-23	Bracket
13-20	Y/B board fixing screws	13-24	B-motor cable
13-21	B-motor		

Installation

1 Install in reverse order.

Pay attention to correct positioning of the encoder head as shown in Figure 6-158.

2 Ensure Operating Readiness as described in Section 6.10.7.

Scanner Head, Scanner Cable

Removal

The item numbers mentioned refer to Figure 6-159, 'Scanner head assembly'.

1 Remove casing (13-15) as shown in Figure 6-155, 'Y/B board assembly'.

2 Remove scanner head housing (13-28).

3 Unscrew cable holders as well as the cable connector (13-25); disconnect scanner cable (13-29) from Y/B board.

- Open fixing screws (13-27) and remove scanner head (13-26).

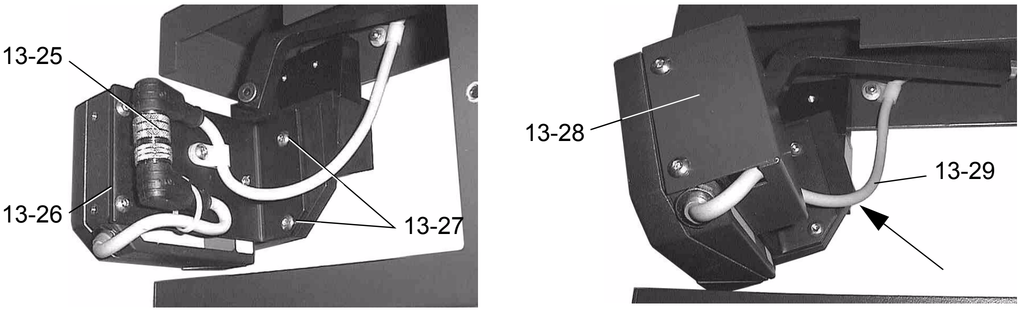


Figure 6-159 Scanner head assembly

13-25	Cable connector	13-28	Housing
13-26	Scanner head	13-29	Scanner cable
13-27	Fixing screws		

Installation

1 Install in reverse order.

Swivel the scanner head up and down and arrange the cable (13-29) in such a way that it does not touch and stick at the point indicated with an arrow in Figure 6-159.

2 Ensure Operating Readiness as described in Section 6.10.7.

6.10.5 Y-Drive Assembly (Y-Belt, Gripper Assembly, Y-Motor)

Required Special Tool

- Spring balance (5 N).

Y-Belt, Gripper Assembly

Removal

The item numbers mentioned refer to Figure 6-161, 'Y-drive assembly'.

1 Remove casing (13-15) as shown in Figure 6-155, 'Y/B board assembly'.

2 Loosen the belt tensioning screws (13-36).

3 Remove gripper assembly (13-34); remove Y-belt (13-33).

Installation

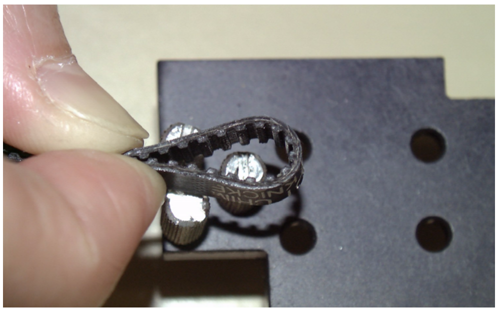


Figure 6-160 Installation of theY-belt

1 Install in reverse order.
   - Lead Y-belt according to Figure 6-160 around the driver pins.
   - Use a spring balance to tension the Y-belt to 3–5 N.

2 Ensure Operating Readiness as described in Section 6.10.7.

Y-Motor

Removal

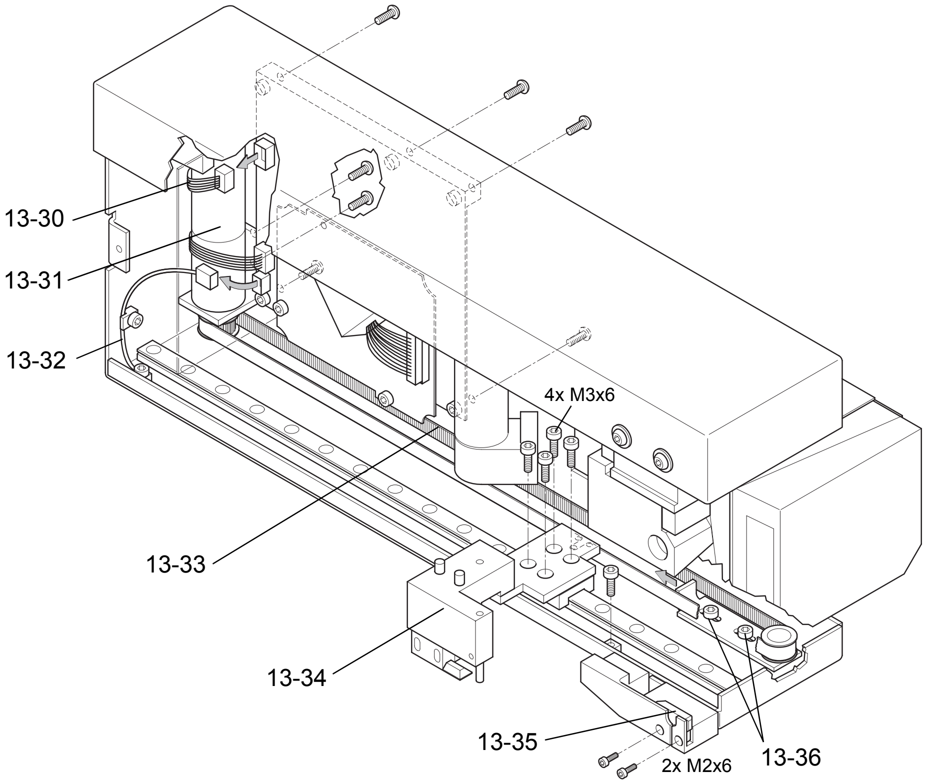


Figure 6-161 Y-drive assembly

13-30	Y-motor cable	13-34	Gripper assembly
13-31	Y-motor	13-35	No tube sensor
13-32	No tube sensor cable	13-36	Belt tensioning screws
13-33	Y-belt		

1 Remove casing (13-15) as shown in Figure 6-155, ‘Y/B board assembly’.

2 Loosen the belt tensioning screws (13-36).

3 Disconnect Y-motor cable (13-30) from Y/B board.

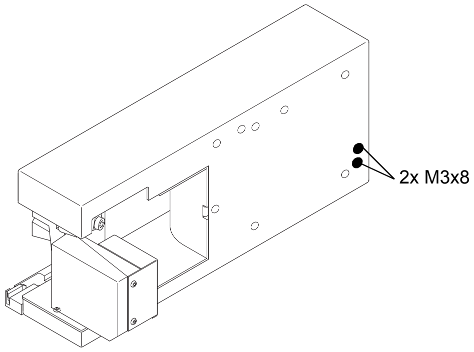


Figure 6-162 Y-motor fixing screws

4 On the exterior of the PosID 2, unscrew fixing screws (Figure 6-162) and remove Y-motor assembly.

5 Remove drive pulley (set screw) and bracket from Y-motor (13-31).

Installation

1 Install in revers order.

- Note the correct orientation of the encoder head (see Figure 6-161).
- When installing the drive pulley, make sure the set screw is perpendicular to the flat part of the axle.
- Tension the Y-belt as described earlier in this section (see Y-Belt, Gripper Assembly).

2 Ensure Operating Readiness as described in Section 6.10.7.

6.10.6 No Tube Sensor

Removal

The item numbers mentioned refer to Figure 6-161, ‘Y-drive assembly’.

1 Remove casing (13-15) as shown in Figure 6-155, ‘Y/B board assembly’.

2 Unscrew cable clamps, disconnect no tube sensor cable (13-32) from Y/B board.

3 Remove no tube sensor (13-35).

Installation

1 Install in reverse order.

2 Ensure Operating Readiness as described in Section 6.10.7

6.10.7 Ensure Operating Readiness

Required Special Tool

- PosID service rack (see Section 6.2.1, 'Special Tools')

Tests to Be Performed

For detailed information refer to the Genesis Instrument Software Manual.

After replacing any part of the PosID 2, control – and if necessary carry out – following settings:

Step	Test or Setup
1	CAN-bus resistance (see Section 6.2.3)
2	Check/adjust barcode setting
3	PosID test
4	PosID adjustment *Only necessary if PosID test failed*
5	Random move *Attention: never perform a random move test with a Genesis RMP!*

7 Check Lists Spare Parts

Purpose of This Chapter

This chapter contains a list of all items which can be replaced at the customers site. It is structured in the sequence of disassembly of an item, therefore, it can also be used by experienced FSEs as brief instructions.

Chapter Overview

This chapter consists of the following sections:

Section	Title	Page
7.1	Spare Parts Instrument	7 – 2
7.1.1	Spare Parts Worktable	7 – 2
7.1.2	Spare Parts Door Locks	7 – 3
7.1.3	Spare Parts X-Drive Assembly	7 – 4
7.1.4	Spare Parts Power Modules	7 – 5
7.1.5	Spare Parts Electronic Boards	7 – 7
7.2	Spare Parts Liquid System	7 – 10
7.2.1	Spare Parts Tubing Systems	7 – 10
7.2.2	Spare Parts Diluter/Dilback	7 – 12
7.2.3	Spare Parts MPO/FWO	7 – 14
7.2.4	Spare Parts Low Volume Option	7 – 16
7.2.5	Spare Parts 6-Way Valve Option	7 – 18
7.3	Spare Parts LiHa 1	7 – 20
7.4	Spare Parts LiHa 2	7 – 22
7.5	Spare Parts RoMa 1	7 – 25
7.6	Spare Parts RoMa 2	7 – 27
7.7	Spare Parts PosID 1	7 – 29
7.8	Spare Parts PosID 2	7 – 31

Spare Parts

- Use original Tecan spare parts only.

Note

Spare parts must correspond with the technical requirements laid down by the manufacturer.

7.1 Spare Parts Instrument

7.1.1 Spare Parts Worktable

Detailed Description

Refer to Section 6.3.1, 'Worktable' for more detailed information.

Check List and Spare Parts Numbers

Brief instructions for removal of the worktable spare parts. Install in reverse order.

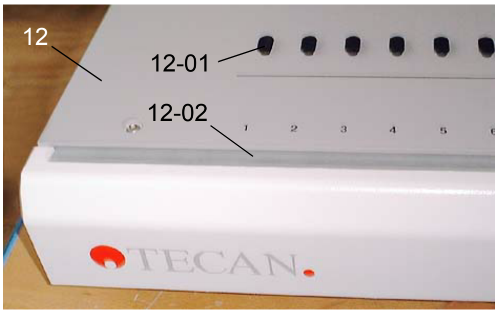


Figure 7-1 Spare parts worktable

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– Empty worktable – Additional worktable (RMP, RWS) – Door locks, magnet holders (RMP, RWS) – Fixing screws	Worktable	12	see Order Configuration sheet)
	Positioning pins (set of all pin types)	12-01	619 001
	Sealing strip (200 cm)	12-02	619 003

7.1.2 Spare Parts Door Locks

Detailed Description

For RMP

For the description of disassembly and assembly procedure for the Genesis RMP door locks, please refer to the document Doc ID 391260.

For RSP, RWS

The door lock is part of the access option for RSP and RWS instruments. Please refer to document Doc ID 392 330 for further information.

Spare Parts Numbers

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
For RMP			
see document Doc ID 391260	Door lock left side Door lock right side	21	750 020 750 021
For RSP, RWS			
see document Doc ID 392 330	Door locks (left and right)	21	619 847

7.1.3 Spare Parts X-Drive Assembly

Detailed Description

Refer to Section 6.3.3, 'X-Drive Assembly' for more detailed information.

Check List and Spare Parts Numbers

Brief instructions for removal of the X-drive spare parts. Install in reverse order.

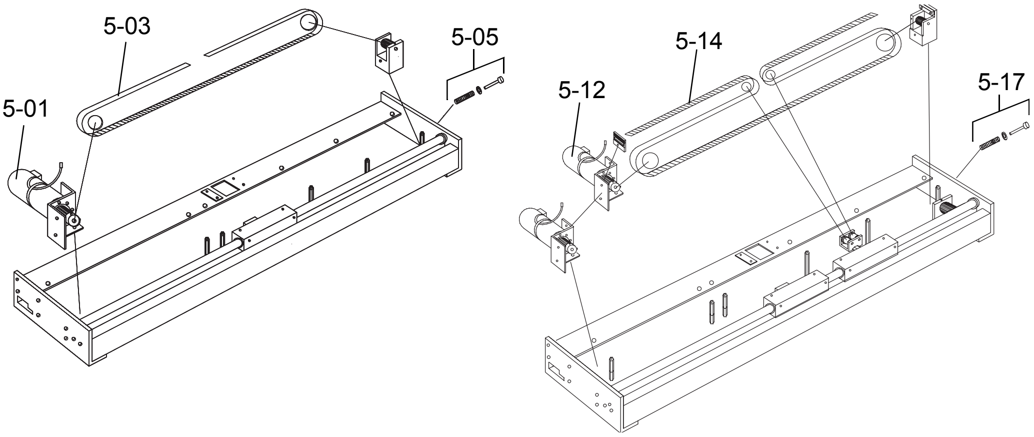


Figure 7-2 Spare parts X-drive assembly LiHa (left) and RoMa (right)

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– Arm of the relevant X-drive – For RMP instruments only: System liquid container and steel plate supporting the Supervisor/Uniport board			
– Belt tensioner	Belt tensioner	5-05, 5-17	619 216
– Loosen belt take-up fixing screws			
– X-belt	X-belt (5.5 m)	5-03, 5-14	619 212
– Both X-belts – Tubing cover (left service compartment) – X-motor cables from the CU board –Fixing screws motor assembly			
– X-motor	X-DC-Servo motor with cable and bracket	5-01, 5-12	619 320*

Note

Part Numbers marked with an asterisk (*) occur in several modules.

7.1.4 Spare Parts Power Modules

Supply Ratings

Refer to Section 3.1.2, ‘Supply Ratings’.

Spare Parts Numbers

Power module	Valid for	Part no.
Old generation	RSP 100/150/200, RWS 100	619 324
Old generation	RMP 100/150/200	750 000
Old generation	RWS 150/200	750 003
PM 1	RSP 100, RWS 100	619 843
PM 2	RWS 150/200	619 844
PM 3	RMP 100/150/200	619 845
PM 4	RSP 150/200	619 846

Detailed Description

Refer to Section 6.3.4, ‘Power Modules’ for more detailed information.

Check List

Brief instructions for removal of the power module spare parts. Install in reverse order.

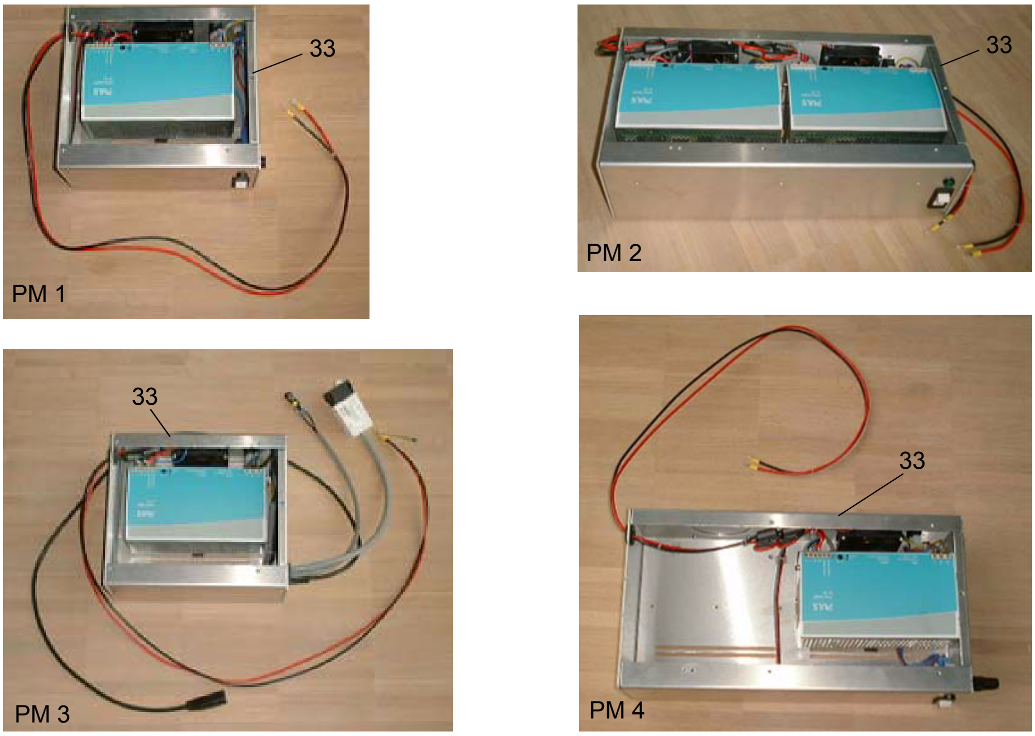


Figure 7-3 Spare parts power modules

Step(s): ➪ do/remove …	**Spare Part**	**Item No.**	**Part No.**
For RSP and RWS			
– Disconnect instrument from mains, set power switch to off – Possibly present panel between diluter compartment and power module – Power module fixing screws – Cables from Optibo – Power module	Power module	33	see separate list earlier in this section
For RMP			
– Disconnect instrument from mains, set power switch to off – Possibly present panel between diluter compartment and power module – Power module fixing screws – Connector sheet – Earth cable from instrument frame, mains cables from power switch – Cable from control lamp – Cables from Optibo – Power module	Power module	33	see separate list earlier in this section

7.1.5 Spare Parts Electronic Boards

Detailed Description

Refer to Section 6.3.5, ‘Electronic Boards’ for more detailed information.

Check List

Brief instructions for removal of the electronic boards spare parts. Install in reverse order.

Optibo, Optibo Power, Fuses

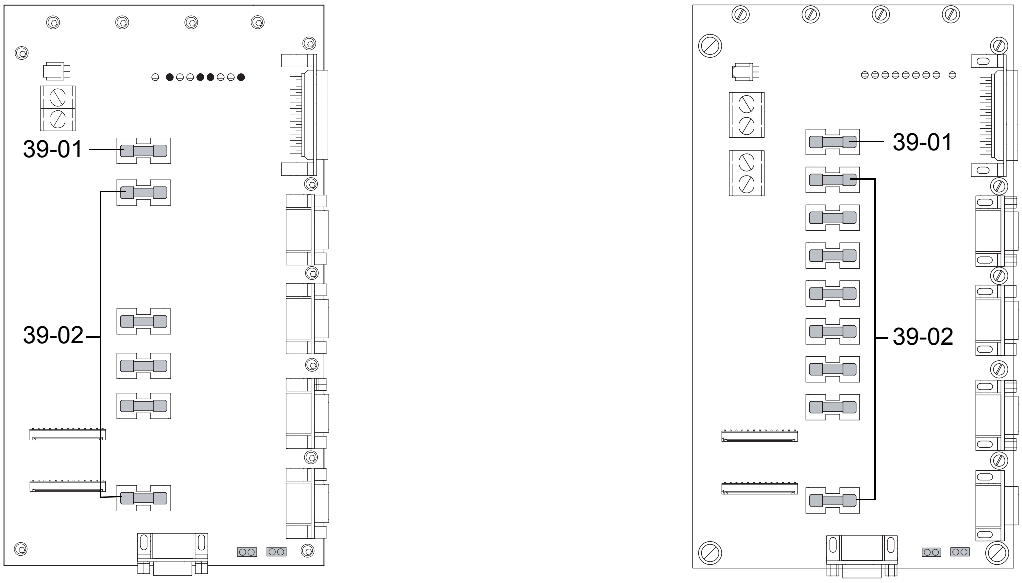


Figure 7-4 Spare parts Optibo/Optibo Power

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– Switch off instrument, disconnect mains power connection – all cables from Optibo/Optibo Power – all cables from CU board – Fixing screws – CU board	Optibo Optibo Power	39 39	619 302 619 313
	Fuses 6.3 AT 8 AT	39-01 39-02	619 821 619 822

CU Board, X-DC-Servo Board

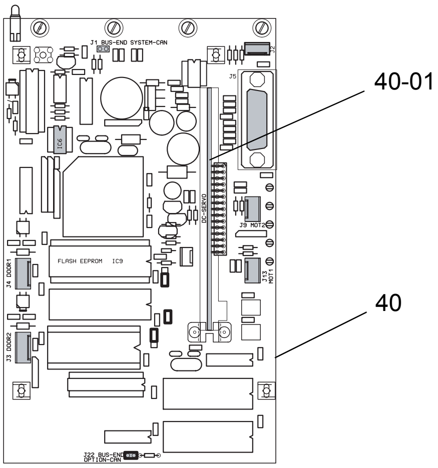


Figure 7-5 Spare parts CU board and X-DC-Servo board

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– Switch off instrument – Optibo/Optibo Power – CU board – X-DC-Servo board	CU board	40	619 301
– X-DC-Servo board	X-DC-Servo board	40-01	619 303*

Note

Part Numbers marked with an asterisk (*) occur in several modules.

Supervisor, Uniport, CANDI Board

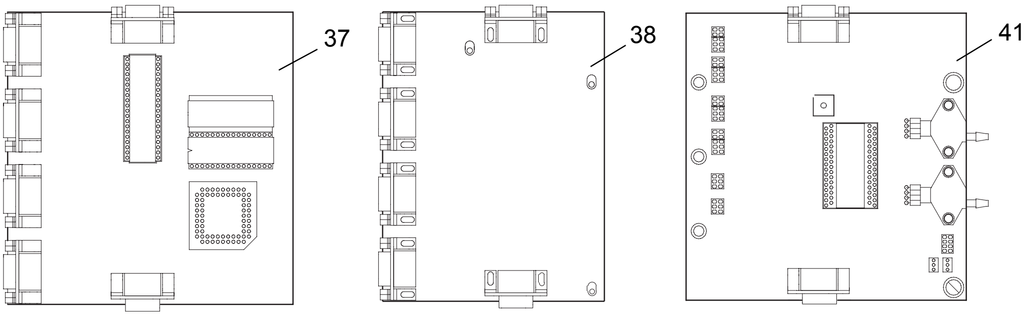


Figure 7-6 Spare parts Uniport, CANDI, Supervisor board

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– For Supervisor board: LICOS and waste tubing from Supervisor board – All cables from the PCB to be removed – Board fixing screws – Connected PCB	Uniport board CANDI board Supervisor board	37 38 41	612 004 612 001 750 011

SMIO/SAFY

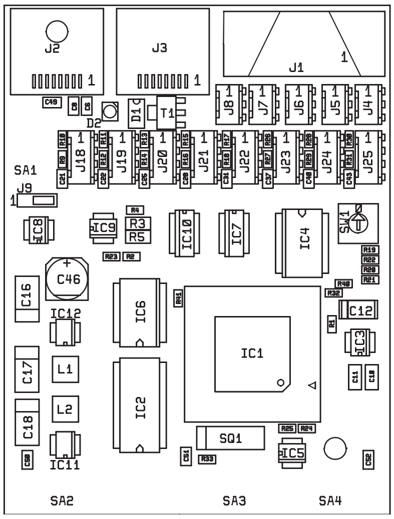

J2
J3
J1
1
J8
J7
J6
J5
J4
D1
T1
D2
SA1
J9
J18
J19
J20
J21
J22
J23
J24
J25
IC8
IC9
R3
R5
IC10
IC7
IC4
SW1
C46
C16
IC12
IC6
IC1
C12
IC3
C17
L1
L2
IC2
C18
IC11
SQ1
IC5
SA2
SA3
SA4

Figure 7-7 SMIO/SAFY

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
see document Doc ID 392 330	SMIO/SAFY		619 850

7.2 Spare Parts Liquid System

7.2.1 Spare Parts Tubing Systems

Detailed Description

For more detailed description refer to Section 6.4.2, 'Tubing System'.

Standard Tubing

Brief instructions for removal of the spare parts for the tubing system. Install in reverse order.

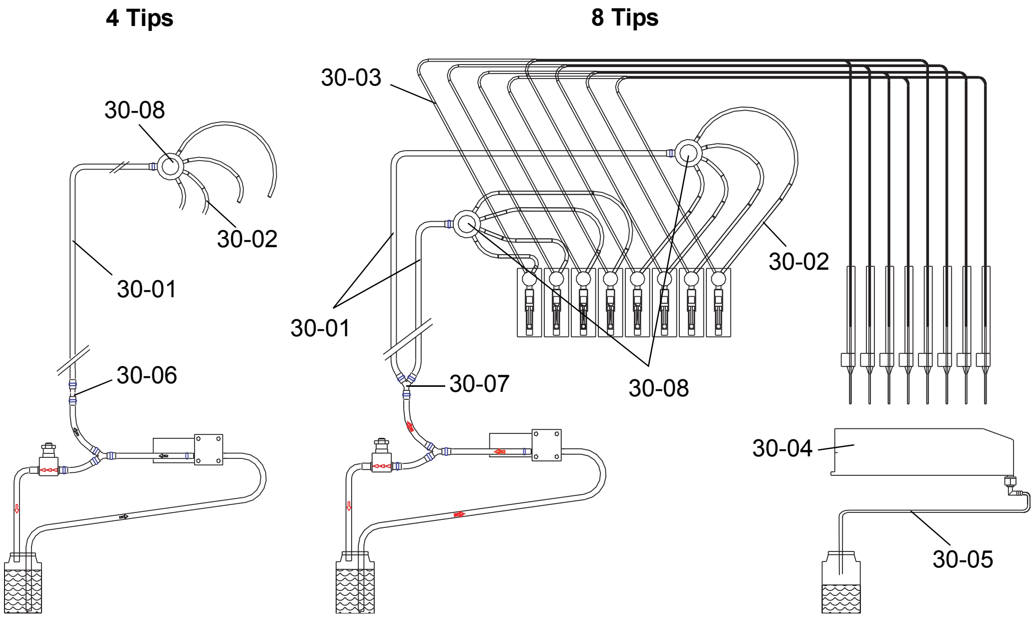


Figure 7-8 Spare parts for standard tubing system

Step(s): ➪ do/remove …	Spare Part	Item No.	Part No.
Standard Tubing			
– Empty liquid system – Replace relevant tubing	I-connector	30-06	619 412
	Y-connector	30-07	619 410
	Aspiration tubing (PVC)	30-01	619 401
	Distributor 1 to 4 (POM)	30-08	619 406
	Interconnecting tubing (FEP)	30-02	619 402
	Pipetting tubing (FEP)	30-03	619 403 (100/150) 619 408 (200)
	Waste tubing (PVC)	30-05	619 404
	Wash station (PP)	30-04	613 001

High Resistant Tubing Type A and Type B

Brief instructions for removal of the spare parts for the tubing system. Install in reverse order.

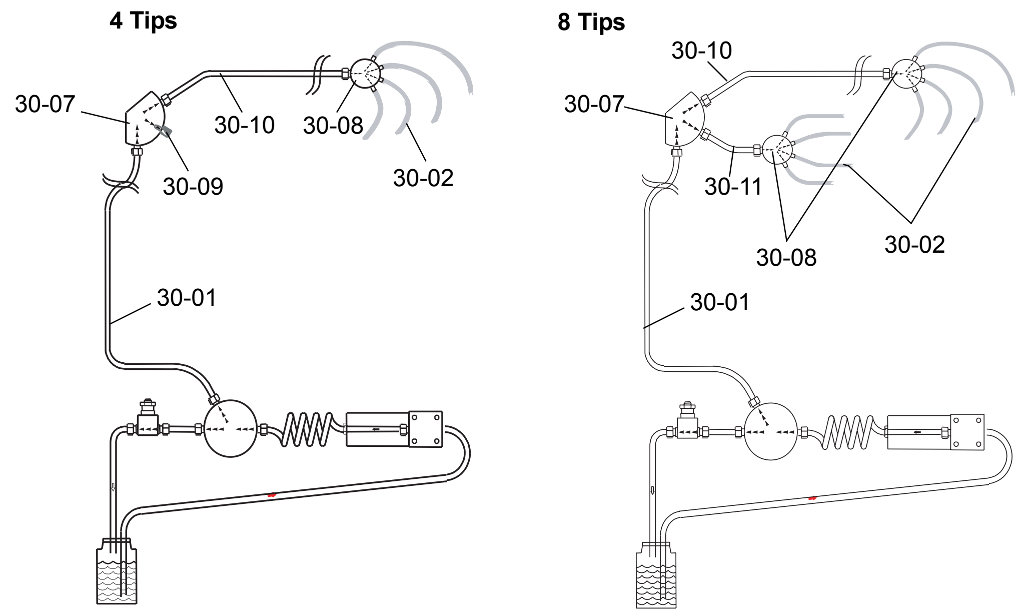


Figure 7-9 Spare parts for high resistant tubing system type A and B

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
High Resistant Tubing Type A (FEP/PVDF)			
– Empty liquid system – Replace relevant tubing	Aspiration tubing (FEP)	30-01	619 486 (100) 619 487 (150) 619 488 (200)
	Distributor 1 to 2 (PVDF)	30-07	619 484
	Screw plug (PVDF)	30-09	619 806
	Tubing to distributor (FEP)	30-10 30-11	619 495 619 496
	Distributor 1 to 4 (PVDF)	30-08	619 482
High Resistant Tubing Type B (FEP/PP)			
– Empty liquid system – Replace relevant tubing	Aspiration tubing (FEP)	30-01	619 486 (100) 619 487 (150) 619 488 (200)
	Distributor 1 to 2 (PP)	30-07	619 804
	Screw plug (PP)	30-09	619 807
	Tubing to distributor (FEP)	30-10 30-11	619 495 619 496
	Distributor 1 to 4 (PP)	30-08	619 803

7.2.2 Spare Parts Diluter/Dilback

Detailed Description

For more detailed description refer to Section 6.4.3, 'Diluter and Dilback'.

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the diluter and dilback. Install in reverse order.

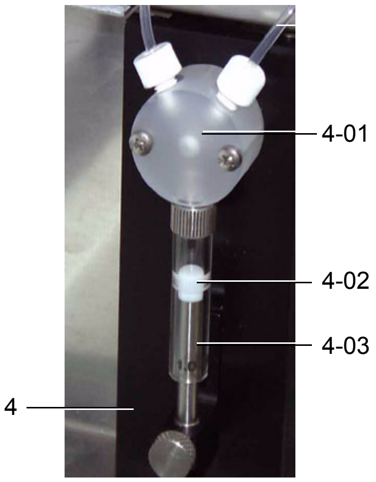


Figure 7-10 Spare parts for low volume option

If syringes with flat caps are used on a validated Genesis instrument, use for replacement also syringes with flat caps.

Do never replace flat syringe caps by conical ones or vice versa.

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Diluter XP 3000 and XP 3000 plus			
– Empty liquid system – Interconnecting and pipetting tubing from diluter – Diluter fixing screw – Pull diluter out of the instrument	XP 3000 XP 3000 plus	4 4	725 813 729 556
Diluter XP 3000 and XP 3000 plus spare parts			
	3-way valve	4-01	727 789
	Syringe with flat caps 0.25 ml 0.5 ml 1.0 ml 2.5 ml 5.0 ml	4-03	 619 423 619 424 619 425 619 426 619 427

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
	Syringe caps, flat (set of 8 pieces)	4-02	
	for syringe 0.25 ml for syringe 0.5 ml for syringe 1.0 ml for syringe 2.5 ml for syringe 5.0 ml		619 428 619 429 619 430 619 431 619 432
	Syringe with conical caps	4-03	
	0.25 ml 0.5 ml 1.0 ml		619 530 619 531 619 532
	Syringe caps, conical (set of 8 pieces)	4-02	
	for syringe 0.25 ml for syringe 0.5 ml for syringe 1.0 ml		619 533 619 534 619 535
Dilback-8			
– All diluters – Cable to Optibo/Optibo Power – Dilback fixing screw	Dilback-8		619 304

7.2.3 Spare Parts MPO/FWO

Detailed Description

For more detailed description refer to Section 6.4.4, 'MPO/FWO'.

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the MPO/FWO. Install in reverse order.

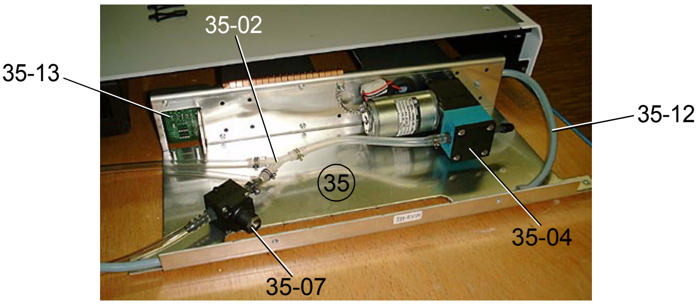


Figure 7-11 Spare parts for MPO/FWO (standard tubing system)

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Standard Material			
– Empty liquid system – Left worktable cover – FaWa pump assembly – Tubing and connection cable	MPO complete FWO complete	35 35	612 702 612 704
– FaWa pump assembly – Tubing – Pump cable from MPO board – Fixing screws	FaWa pump	35-04	619 509
– FaWa pump assembly – Tubing – Fixing screw	Tubing system Distributor 1 to 2 Pressure relief valve	 35-02 35-07	619 434** 619 410 619 540
High Resistant Type A			
– Empty liquid system – Left worktable cover – FaWa pump assembly – Tubing and connection cable	MPO complete FWO complete	35 35	619 542 619 543 (6-way valve option) 619 525 619 527(6-way valve option)
– FaWa pump assembly – Tubing – Pump cable from MPO board – Fixing screws	FaWa pump	35-04	619 538

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
– FaWa pump assembly – Tubing – Fixing screw	Tubing system Distributor 1 to 2 Pressure relief valve	35-02 35-07	612 121*(100) 612 122*(150) 612 123*(200) 619 485 619 541 619 529 (6-way valve option)
High Resistant Type B			
– Empty liquid system – Left worktable cover – FaWa pump assembly – Tubing and connection cable	MPO complete FWO complete	35 35	619 544 619 545 (6-way valve option) 619 510 619 526 (6-way valve option)
– FaWa pump assembly – Tubing – Pump cable from MPO board – Fixing screws	FaWa pump	35-04	619 539
– FaWa pump assembly – Tubing – Fixing screw	Tubing system Distributor 1 to 2 Pressure relief valve	35-02 35-07	612 124*** (100) 612 125*** (150) 612 126*** (200) 619 805 619 540 619 528 (6-way valve option)
LICOS			
– FaWa pump assembly – Tubing from LICOS sensor – Fixing screws	LICOS complete Level tubing Sensor		619 418 619 514 619 501
MPO Board			
– FaWa pump assembly – all cables from MPO board – LICOS from MPO board – Fixing screws	Connection cable MPO board	35-12 35-13	619 415 (100/150) 619 416 (200) 619 312

**Set containing all necessary MPO/FWO tubing, distributor 1 to 2 and pressure relief valve. For spare part numbers of the individual items refer to the detailed spare parts list from customer support.

***Set containing all necessary MPO/FWO tubing. For spare part numbers of the individual items refer to the detailed spare parts list from customer support.

7.2.4 Spare Parts Low Volume Option

Detailed Description

For more detailed description refer to Section 6.4.5, ‘Low Volume Option’.

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the low volume option 1 and 2. Install in reverse order.

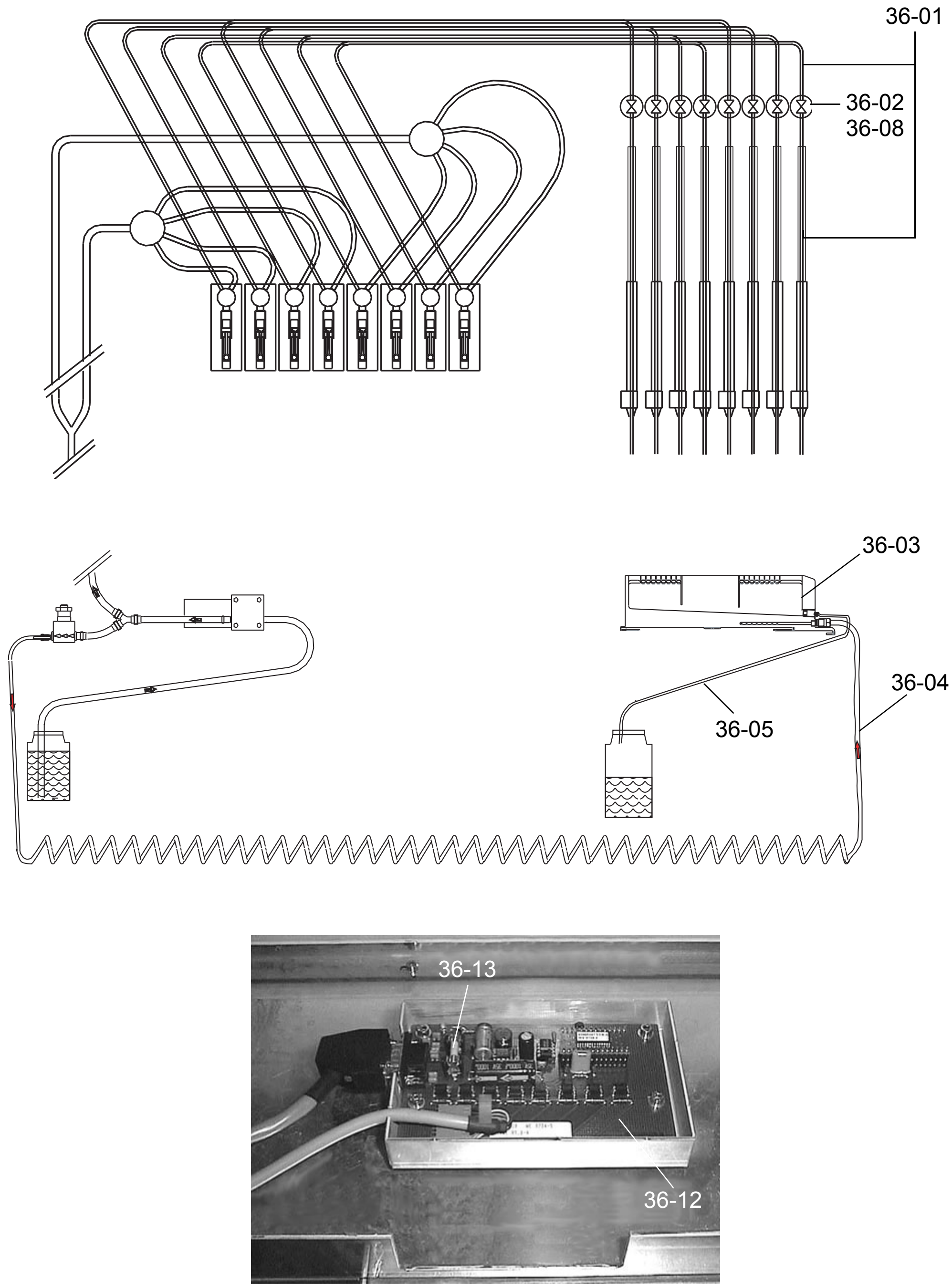


Figure 7-12 Spare parts for low volume option

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Low Volume Option 1			
– Pinch valve tubing – Cover – Valve wires from distribution block – Pinch valve	Pinch valve	36-02	612 806
	Low volume tubing set (FEP/Tygon)	36-01	612 805****
	Pinch valve tubing (DMSO resistant)		619 462
	Set of nuts	36-08	619 465
– Cables from low volume board – fixing screws	Low volume main board	36-12	612 813
	Fuse (8 AT)	36-13	2003126
Low Volume Option 2			
– Pipetting tubing from the solenoid valve – Cover – Valve wires from distributor board – Solenoid valve	Solenoid valve	36-02	612 814
	Low volume tubing set (FEP)	36-01	612 811****
– Cables from low volume board – fixing screws	Low volume main board	36-12	612 813
	Fuse (8 AT)	36-13	2003126
Low Volume Wash Station			
	Wash station low volume (PP)	36-03	613 033
	Waste tubing	36-05	619 491
	Fill tubing	36-04	619 490

****Set containing pipetting tubing, support tubing and – for option 1 only – pinch valve tubing.

7.2.5 Spare Parts 6-Way Valve Option

Detailed Description

For more detailed description refer to Section 6.4.6, ‘6-Way Valve Option’.

Check List and Spare Parts Numbers

Brief instructions for removal of the spare parts for the 6-way valve option. Install in reverse order.

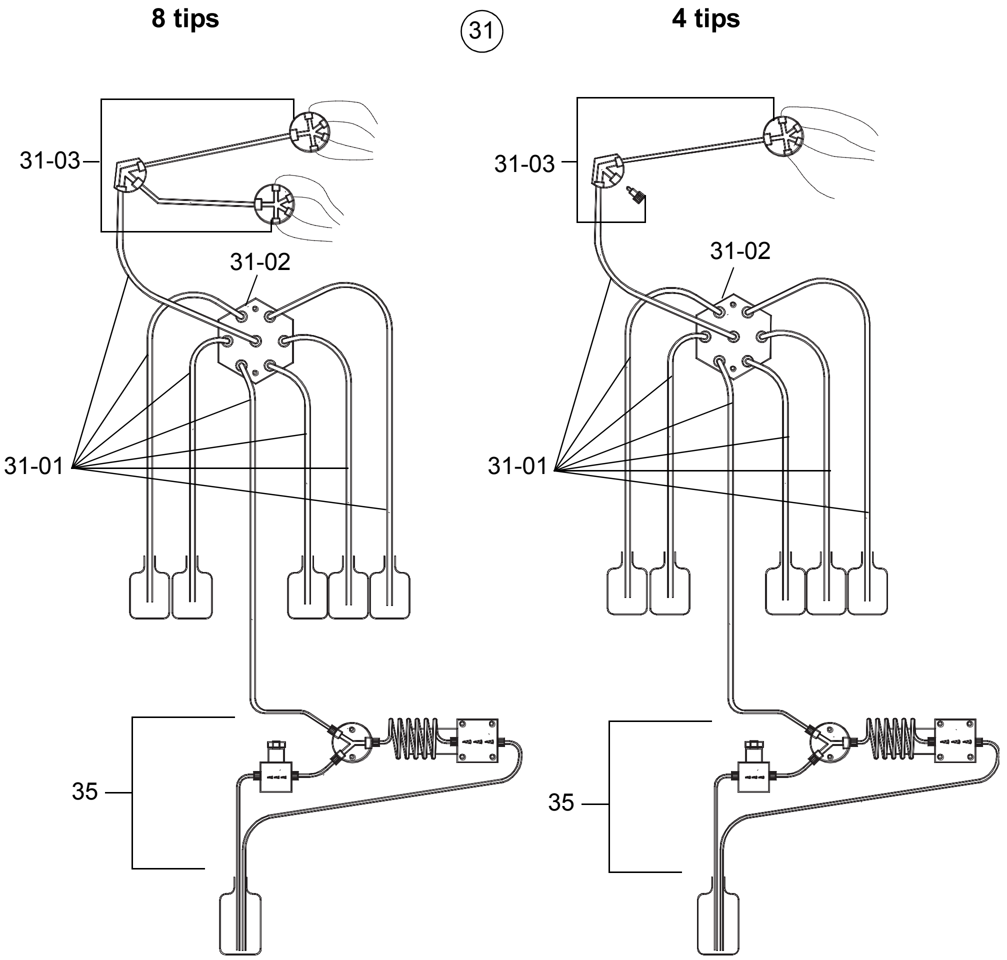

8 tips
31
4 tips
31-03
31-02
31-01
35
31-03
31-02
31-01
35

Figure 7-13 Spare parts for 6-way valve option (standard configurations)

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
– Empty liquid system – Connection cable from Optibo Power) – All tubing from 6-way valve option – Collecting pan	6-way valve assembly (valve and board)	31-02	612 118
	Aspirating tubing/ fittings	31-01	619 536**
	Top tubing complete (FEP/PVDF) (FEP/PP)	31-03	 612 120** 612 119**

**Set; for spare part numbers of the individual items refer to the detailed spare parts list from customer support.

7.3 Spare Parts LiHa 1

Detailed Description

For more detailed description refer to Section 6.5, ‘LiHa 1 – Disassembly and Assembly Procedures’.

Check List and Spare Parts Numbers

Brief instructions for removal of the LiHa 1 spare parts. Install in reverse order.

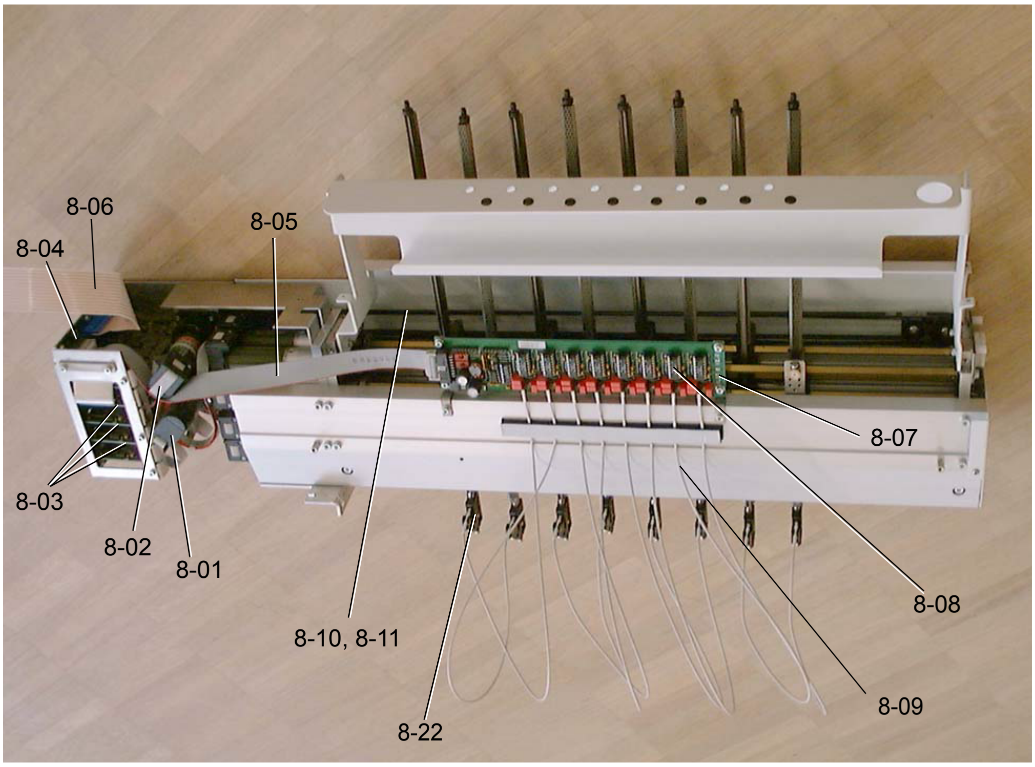


Figure 7-14 LiHa 1 spare parts

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Cables			
– Left cover – X-flex cable from LiHa backplane, Optibo/Optibo Power and X-bay	X-flex cable	8-06	619326 (100) 619327 (150) 619328 (200)
– Left cover – ILID cable from tip adapter and ILID board	ILID cable	8-09	619 310
– Left cover – ILID flat cable from ILID board and LiHa backplane	ILID flat cable	8-05	619 233

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Electronic Boards			
– Complete LiHa 1 assembly from instrument – All cables from LiHa backplane – Board cage, DC-Servo boards	DC-Servo boards LiHa backplane	8-03 8-04	619 303* 619 311
– Left cover – All cables from ILID board – ILID board	ILID board for 4 tips for 8 tips	8-07	619 307 619 308
– Left cover – ILID chip from ILID board	ILID chip	8-08	619 309
Belts			
– Complete LiHa 1 assembly from instrument – Loosen tensioning screws – Belt lock	Y-belt, Y-spreading belt (set of 2 x 2 m)	8-10, 8-11	619 215
Motors			
– Complete LiHa 1 assembly from instrument – Board cage – Y- and Y-spreading belt – Motor bracket – Y- or Y-spreading motor cable from LiHa backplane – Pulley – Motor fixing screws	Y-DC-Servo motor, Y-spreading DC-Servo motor	8-02, 8-01	619 321*
Tip Adapter			
– ILID cable from tip adapter – Tip adapter	Tip adapter	8-22	619 211

Note

Part Numbers marked with an asterisk (*) occur in several modules.

7.4 Spare Parts LiHa 2

Detailed Description

For more detailed description refer to Section 6.6, 'LiHa 2 – Disassembly and Assembly Procedures'.

Check List and Spare Parts Numbers

Brief instructions for removal of the LiHa 2 spare parts. Install in reverse order.

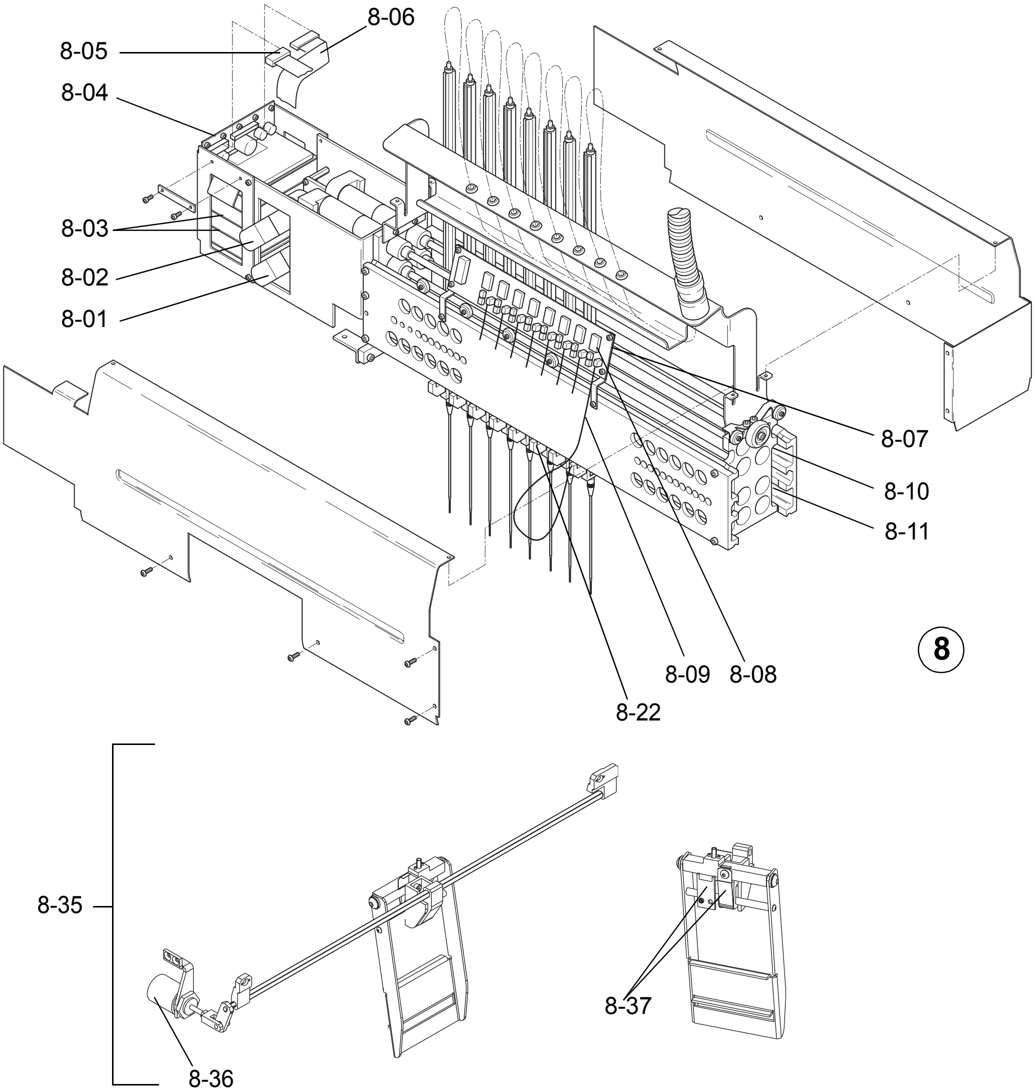

8-06
8-05
8-04
8-03
8-02
8-01
8-07
8-10
8-11
8
8-09
8-08
8-22
8-35
8-37
8-36

Figure 7-15 LiHa 2 spare parts

Note

Part Numbers marked with an asterisk (*) occur in several modules.

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
Complete LiHa 2 Assembly			
– Pipetting tubing, covers, tubing shelf – Unscrew LiHa 2 from X-slide, lift off – X-flex cable from Optibo/ Optibo Power and X-bay	LiHa 2 assembly for 4 tips for 8 tips	8	 619 204 619 208
Cables			
– Left cover – X-flex cable from LiHa backplane, Optibo/Optibo Power and X-bay	X-flex cable	8-06	619326 (100) 619327 (150) 619328 (200)
– Left cover – ILID cable from tip adapter and ILID board	ILID cable	8-09	619 310
– Left cover – ILID flat cable from ILID board and LiHa backplane	ILID flat cable	8-05	619 233
Electronic Boards			
– Complete LiHa 2 assembly from instrument – All cables from LiHa backplane – Board cage, DC-Servo boards	DC-Servo boards LiHa backplane	8-03 8-04	619 303* 619 311
– Left cover – All cables from ILID board – ILID board	ILID board for 4 tips for 8 tips	8-07	 619 307 619 308
– Left cover – ILID chip from ILID board	ILID chip	8-08	619 309
Belts			
– Complete LiHa 2 assembly from instrument – Board cage – Y- or Y-spreading motor – Belt lock	Y-belt, Y-spreading belt (set of 2 x 2 m)	8-10, 8-11	619 215
Motors			

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
– Complete LiHa 2 assembly from instrument – Board cage – Y- or Y-spreading motor cable from LiHa backplane – Motor assembly – Pulley	Y-DC-Servo motor, Y-spreading DC-Servo motor	8-02, 8-01	619 321*
Tip Adapter			
– ILID cable from tip adapter – Tip adapter	Tip adapter	8-22	619 211
Lower DiTi Eject Option			
– Complete LiHa 2 assembly from instrument – Solenoid cable from backplane – Fixing screws	Lower DiTi eject option 2 (4/8 tips)	8-35	612 550
– Complete LiHa 2 assembly from instrument – Solenoid cable from backplane – Link lock, solenoid fork, fixing nuts	Solenoid	8-36	619 520
– Rocker stop, leaf spring	Upgrade kit	8-37	619 250

7.5 Spare Parts RoMa 1

Detailed Description

For more detailed description refer to Section 6.7, ‘RoMa 1 – Disassembly and Assembly Procedures’.

Check List and Spare Parts Numbers

Brief instructions for removing the spare parts. Install in reverse order.

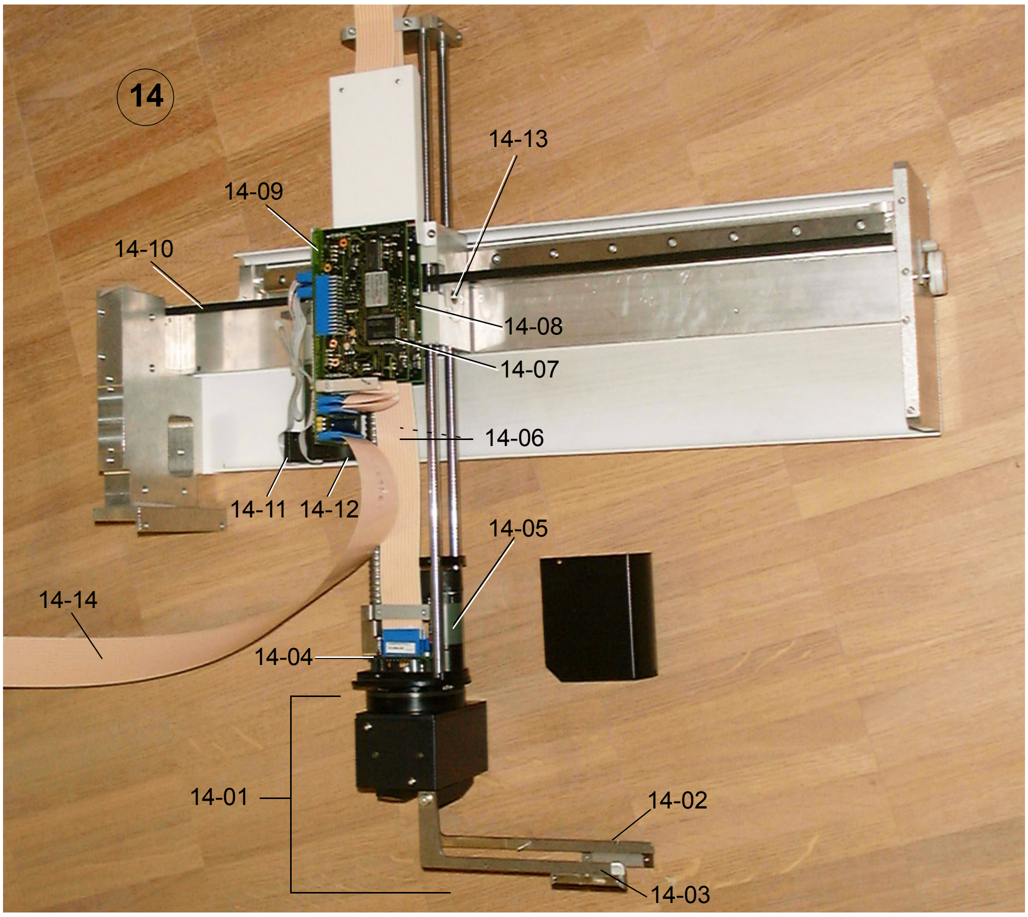


Figure 7-16 RoMa 1 spare parts

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Complete RoMa 1 Assembly			
– X-flex cable from Optibo/ Optibo Power and cable duct – Unscrew and lift out module	RoMa 1 assembly	14	612 600
Mechanical parts			
– Long gripper finger	Long gripper finger	14-02	619 511
– Short gripper finger	Short gripper finger	14-03	619 512

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– Rotator cover – Cables from gripper board – Wires gripper connector – Gripper board	Gripper module	14-01	612 601
– Release belt tension – Fixing elements back/front	Y-belt	14-10	619 513
Cables			
– Front and left side cover – Cable clamps	X-flex cable	14-14	619 340 (100) 619 341 (150) 619 342 (200)
– RoMa 1 assembly – Left side cover – Various brackets & clamps – Y/R- & Z/G-DC-Servo boards – Disconnect cable	Gripper/Rotator flex cable	14-06	619 344
Electronic boards			
– Rotator cover – Cables from gripper board – Wires gripper connector	Gripper board	14-04	619 300
– Disconnect cables – Retaining clamps	Z/G-DC-Servo board Y/R-DC-Servo board	14-07 14-08	619 303* 619 303*
– Disconnect cables – Z/G-DC-Servo board – Y/R-DC-Servo board	RoMa 1 backplane	14-09	619 343
Motors			
– Gripper board – Gripper module	Rotator motor	14-05	619 345
– Disconnect cables – Y/R-DC-Servo board, Z/G-DC-Servo board	Z-DC-Servo motor	14-12	619 346
– Release Y-belt tension – Y-pulley	Y-DC-Servo motor	14-13	619 323
Z-brake			
Replace	Z-brake	14-13	619 891

Note

Part Numbers marked with an asterisk (*) occur in several modules.

7.6 Spare Parts RoMa 2

Detailed Description

For more detailed description refer to Section 6.8, ‘RoMa 2 – Disassembly and Assembly Procedures’.

Check List and Spare Parts Numbers

Brief instructions for removing the spare parts. Install in reverse order.

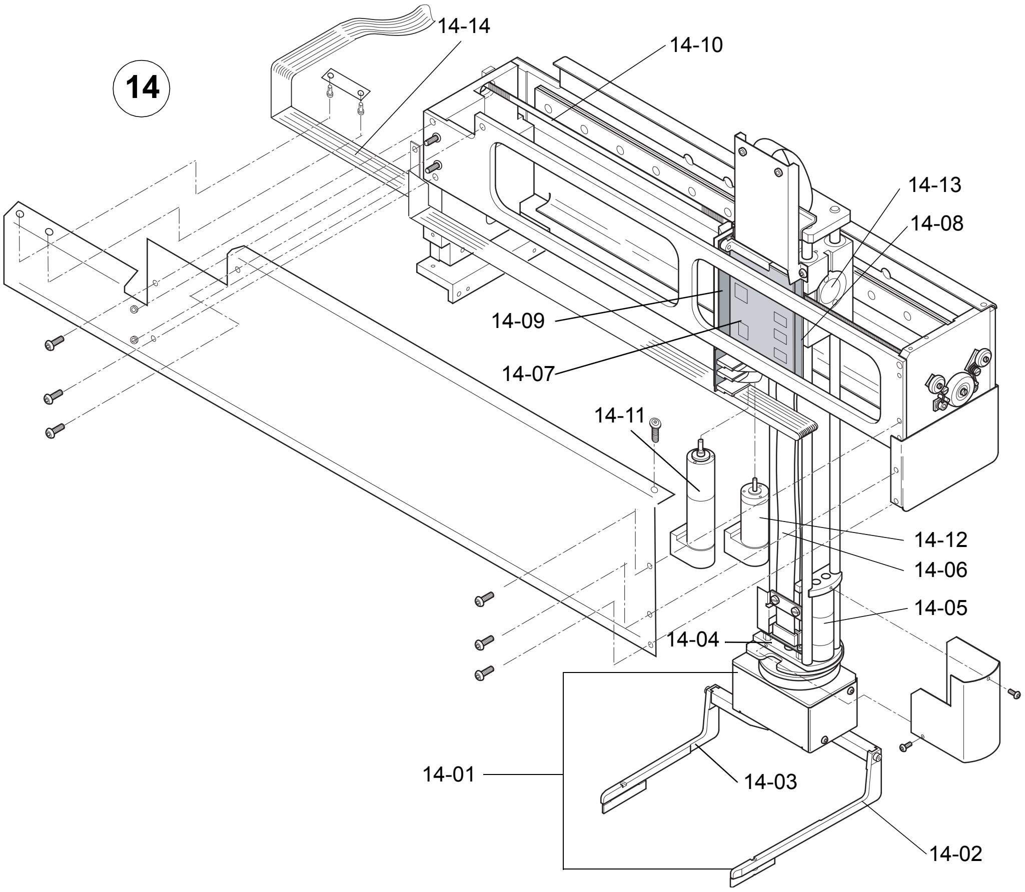


Figure 7-17 RoMa 2 spare parts

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
Complete RoMa 2 Assembly			
– X-flex cable from Optibo/ Optibo Power and cable duct – Unscrew and lift out module	RoMa 2 assembly	14	612 630
Mechanical parts			
– Long gripper finger	Long gripper finger	14-02	692 511
– Short gripper finger	Short gripper finger	14-03	692 512

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
– Rotator cover – Cables from gripper board – Wires gripper connector – Gripper board	Gripper module	14-01	612 601
– Release belt tension – Fixing elements back/front	Y-belt	14-10	619 513
Cables			
– Front and left side cover – Cable clamps	X-flex cable	14-14	619 340 (100)) 619 341 (150) 619 342 (200)
– RoMa 2 assembly – Left side cover – Left side plate – Various brackets & clamps – Y/R- & Z/G-DC-Servo boards – Disconnect cable	Gripper/Rotator flex cable	14-06	619 344
– Rotator cover – Cables from gripper board – Wires gripper connector	Gripper board	14-04	619 300
– Disconnect cables – Retaining clamps	Z/G-DC-Servo board Y/R-DC-Servo board	14-07 14-08	619 303* 619 303*
– Disconnect cables – Z/G-DC-Servo board – Y/R-DC-Servo board	RoMa 2 backplane	14-09	612 633
Motors			
– Gripper board – Gripper module	Rotator motor	14-05	619 345
– Disconnect cables – Y/R-DC-Servo board, Z/G-DC-Servo board	Z-DC-Servo motor	14-11	619 346
– Release Y-belt tension – Y-pulley	Y-DC-Servo motor	14-12	619 323
Z-brake			
– Disconnect cable – Unscrew – (Check shoe distance before reinstalling!)	Z-brake	14-13	612 632

Note

Part Numbers marked with an asterisk (*) occur in several modules.

7.7 Spare Parts PosID 1

Detailed Description

For more detailed information, refer to Section 6.9, ‘PosID 1 – Disassembly and Assembly Procedures’.

Check List and Spare Parts Numbers

Brief instructions for removal of the PosID 1 spare parts. Install in reverse order.

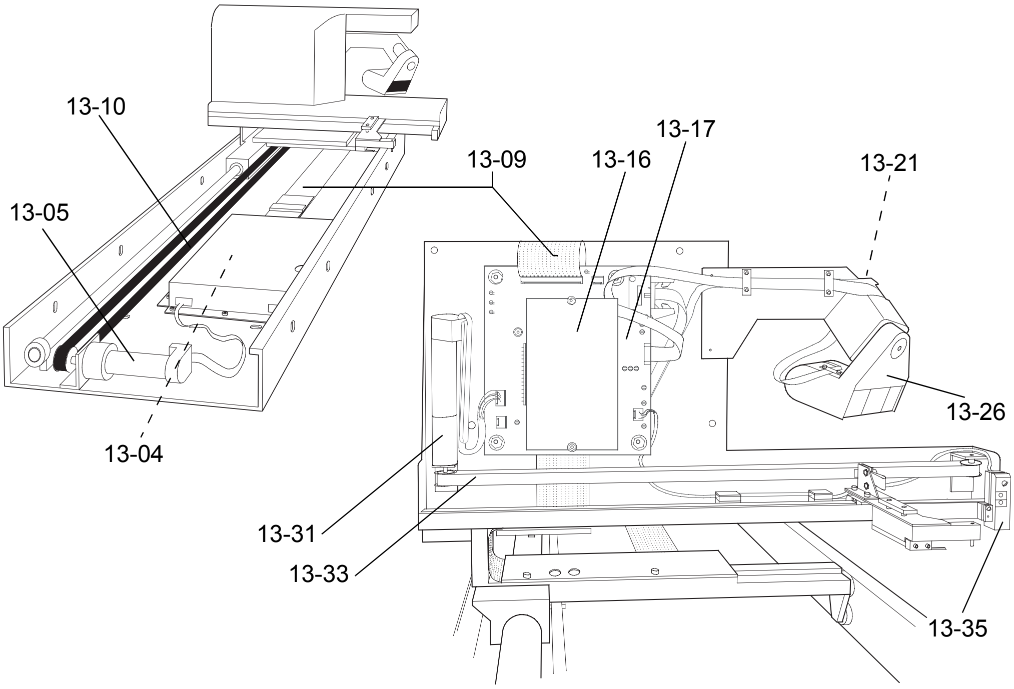


Figure 7-18 Spare parts PosID 1

Note

Part Numbers marked with an asterisk (*) occur in several modules.

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
X-Drive Assembly			
– Worktable – X-belt tension – Belt fixing screw	X-belt (3.7 m)	13-10	619 506
– Worktable – X-belt tension – X-motor cable from PosID CU board – X-motor bracket – Pulley	X-DC-Servo motor	13-05	619 321*

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
– Worktable – X-flex cable from PosID 1 CU board – Flex cable fixtures – Casing – X-flex cable from Y/B board	X-flex cable	13-09	619 329 (100) 619 330 (150) 619 331 (200)
Electronic Boards			
– Worktable – Cover and all cables from PosID 1 CU board – X-DC-Servo board – Fixing screws	X-DC-Servo board PosID 1 CU board	13-04	619 303* 619 306
– Casing – Y/B-DC-Servo board – all cables from Y/B board – Fixing screws	Y/B-DC-Servo board Y/B board	13-16 13-17	619 303* 619 332
Scanner Assembly			
– Casing – Scanner flex cable from Y/B Board – Flex cable holders – Set screw	Scanner head	13-26	619 505
– Scanner head – B-motor cable from Y/B board – B-motor fixing screws	B-DC-Servo motor	13-21	619 322
Y-Drive Assembly			
– Casing – Y-belt tension	Y-belt	13-33	619 507
– Casing – Y-belt – Y-motor cable from Y/B board – Y-motor fixing screws – Motor assembly – Pulley, Bracket	Y-DC-Servo motor	13-31	619 321
No tube sensor			
– Casing – No tube sensor cable from Y/B Board and cable holders – No tube sensor fixing screws	No tube sensor	13-35	619 333

7.8 Spare Parts PosID 2

Detailed Description

Refer to Section 6.10, 'PosID 2 – Disassembly and Assembly Procedures'

- for more detailed information
- concerning the older version of PosID 2 CU (located underneath the worktable)

Check List and Spare Parts Numbers

Brief instructions for removal of the PosID 2 spare parts. Install in reverse order.

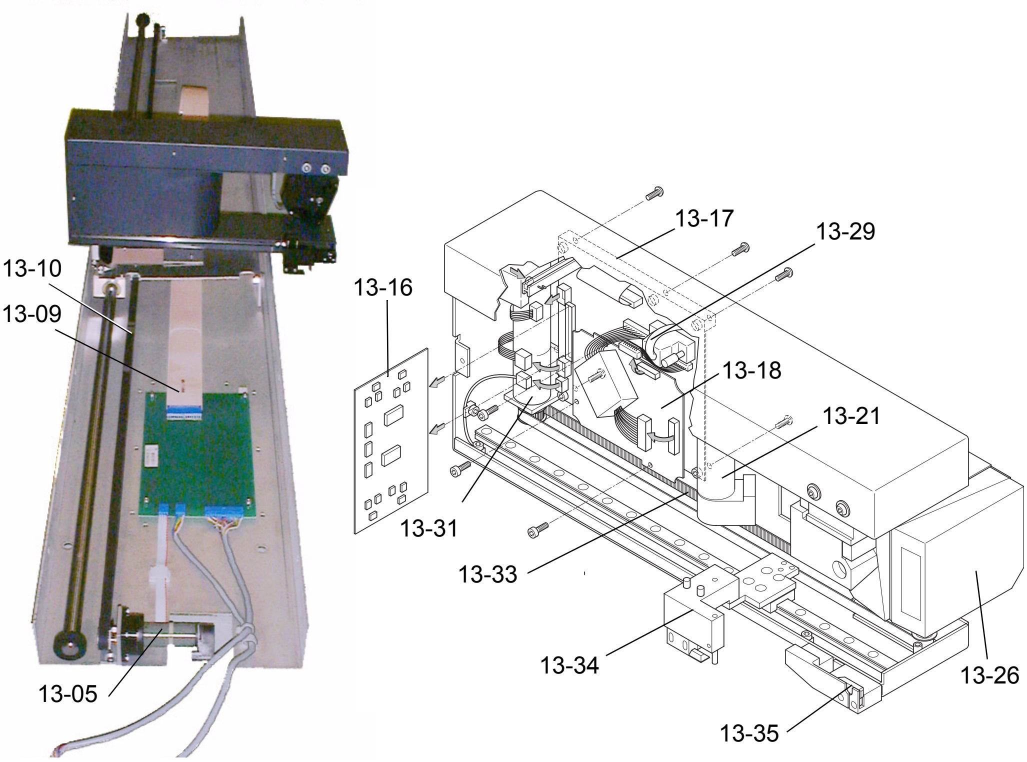


Figure 7-19 Spare parts PosID 2

Note

Part Numbers marked with an asterisk (*) occur in several modules.

Step(s): ⇨ do/remove …	Spare Part	Item No.	Part No.
PosID 2 Assembly			
– Worktable – Connection cable and X-motor cable at PosID 2 CU board – PosID 2 assembly fixing screws	PosID 2 assembly		612 411 (100) 612 412 (150) 612 413 (200)

Step(s): ➩ do/remove …	**Spare Part**	**Item No.**	**Part No.**
X-Drive Assembly			
– Worktable – X-belt tension – Belt fixing screw	X-belt (5 m)	13-10	619 611
– Worktable – X-belt tension – X-motor cable from PosAda – Pulley – X-motor bracket	X-DC-Servo motor	13-05	619 321*
– Worktable – Casing – Flex cable fixtures – Flex cable from PosAda and Y/B board – Y/B board fixing screws	X-flex cable	13-09	619 602 (100/ 150) 619 604 (200)
Electronic Boards			
– Open left Access Door	X-DC-Servo board		619 303*
– Open left Access Door – Cables from PosID 2 CU board – X-DC-Servo board	PosID 2 CU board		619 600
– Casing – Cables from Y/B board – Y/B board fixing screws – Y/B-DC-Servo board – DSP decoding board	Y/B-DC-Servo board Y/B board	13-16 13-17	619 303* 619 605
– Casing – Cables from DSP decoding board – Fixing screws	DSP decoding board	13-18	619 607
Scanner Assembly			
– Casing – Fixing screws and B-motor cable from Y/B board – B-motor fixing screws – Gearing assembly and bracket	B-DC-Servo motor	13-21	619 601
– Casing – Housing – Cable holders – Scanner cable from Y/B Board and cable connector – Fixing screws	Scanner cable Scanner head	13-29 13-26	619 609 619 610

Step(s): ⇨ do/remove …	**Spare Part**	**Item No.**	**Part No.**
Y-Drive Assembly			
– Casing – Y-belt tension – Gripper fixing screws	Gripper assembly Y-belt	13-34 13-33	619 622 619 612
– Casing – Y-belt tension – Y-motor cable from Y/B board – Y-motor fixing screws – Motor assembly – Pulley, Bracket	Y-DC-Servo motor	13-31	619 323*
No tube sensor			
– Casing – Cable clamp and no tube sensor fixing screws – No tube sensor cable from Y/B Board	No tube sensor	13-35	619 606

Note

Part Numbers marked with an asterisk (*) occur in several modules.

8 Instruments at a Glance

Purpose of This Chapter

This chapter contains overviews of the Genesis RSP, RMP and RWS instruments and indicates their main components with item numbers.

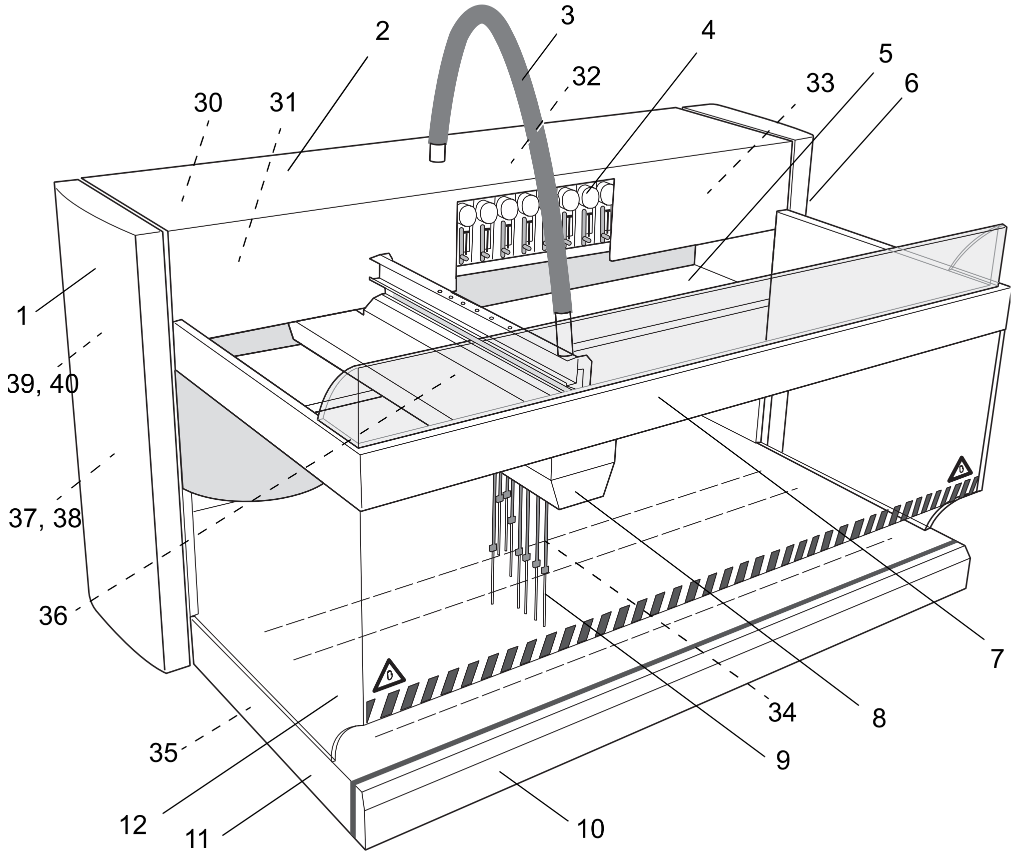
Throughout this document, these main components are always designated with the same item numbers – for example (8) for LiHa – in the detail drawings and the text passages.

Chapter Overview

This chapter consists of the following sections:

Section	Title	Page
8.1	Genesis RSP	8 – 2
8.2	Genesis RMP	8 – 3
8.3	Genesis RWS Logistics	8 – 4
8.4	Genesis RWS Assay	8 – 5

8.1 Genesis RSP



Visible Items	1	Access door (left)	8	LiHa 1, LiHa 2
	2	Top cover	9	Tips
	3	Tubing guide	10	Worktable cover (front)
	4	Diluter	11	Worktable cover (left)
	5	X-bay	12	Worktable
	6	Access door (right)		
	7	Arm guide		

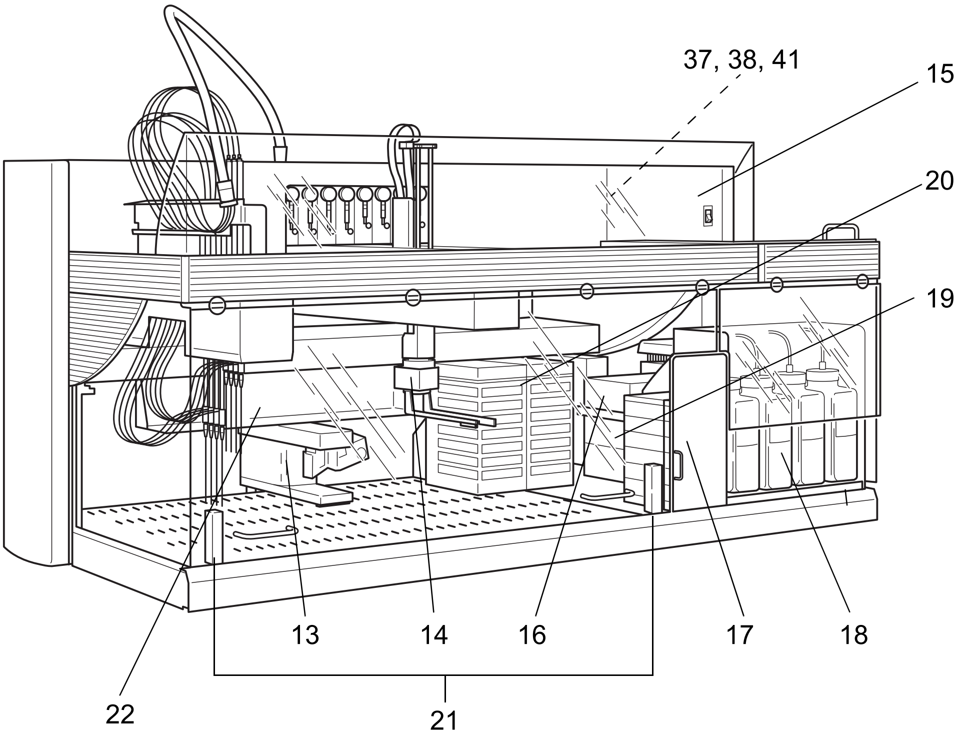
Not Illustrated or Hooded Items	30	Tubing system	36	Low volume option*
	31	6-way valve option	37	Uniport board*
	32	Dilback	38	CANDI board*
	33	Power supply/Power module	39	Optibo
	34	Lower DiTi eject option*	40	CU board
	35	FWO*/MPO*		

Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

8.2 Genesis RMP



Note

Indicated with item numbers are only these items which are – compared with the Genesis RSP – additionally or with a different location.

Visible Items

13	PosID 1/PosID 2*	18	Wash bottle rack
14	RoMa1, RoMa 2	19	Reader*
15	Add-on module*	20	Heated incubator*
16	Washer*	21	Door lock assembly
17	RT-incubator	22	Shelf*

Not Illustrated or Hooded Items

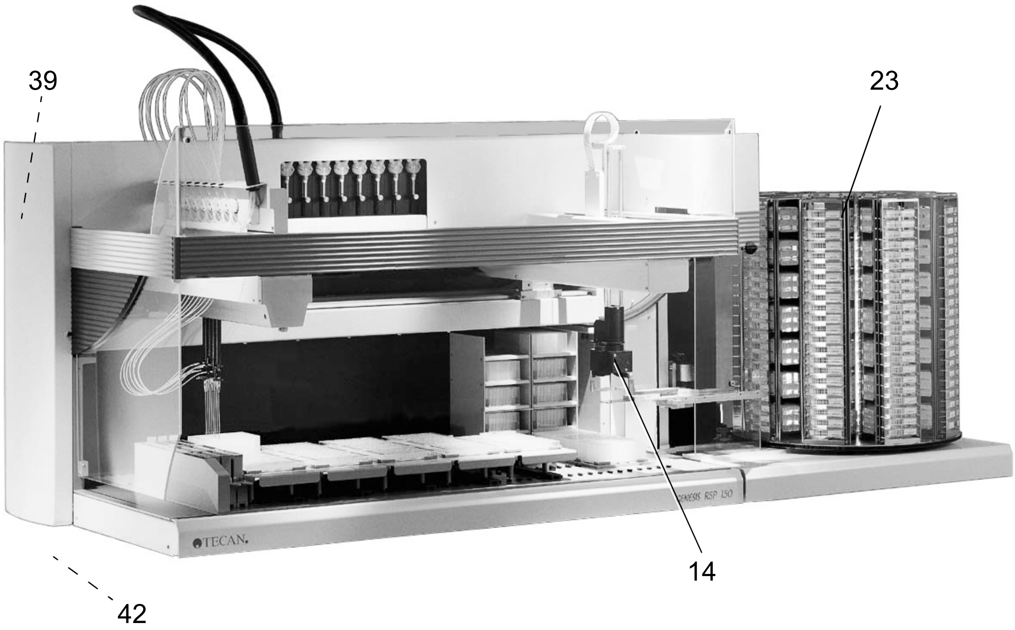
37	Uniport board*
38	CANDI board*
41	Supervisor

Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

8.3 Genesis RWS Logistics



Note

Indicated with item numbers are only these items which are – compared with the Genesis RSP or RMP – additionally or substitutional.

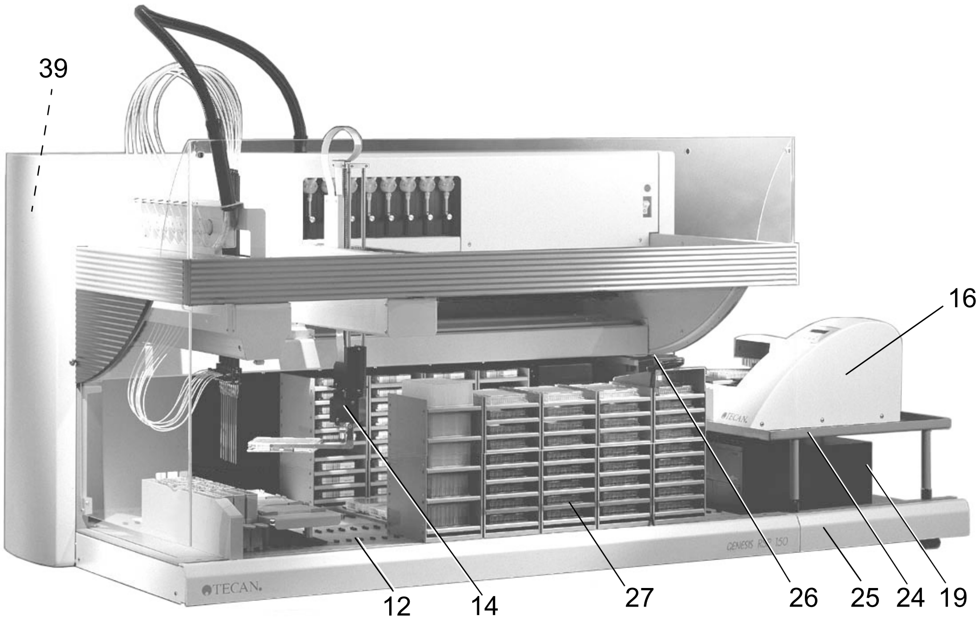
Visible Items	14 RoMa 1/RoMa 2 23 Carousel*
Not Illustrated or Hooded Items	39 Optibo/Optibo Power 42 Variable extension deck*

Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

8.4 Genesis RWS Assay



Note

Indicated with item numbers are only these items which are – compared with the Genesis RSP or RMP – additionally or substitutional.

Visible Items

12	Cut out worktable
14	RoMa 1/RoMa 2
16	Washer*
19	Reader*
24	Mounting assembly for washer*
25	Workstation extension*
26	Barcode reader*
27	On-deck plate hotel*

Hooded Item

39	Optibo Power

Note

Items marked with an asterisk (*) are optional components and therefore not available on all instruments.

The instrument may be equipped with more standard or optional items which are shown on the overview of the other instruments.

9 Diagrams

Purpose of This Chapter

This chapter contains the relevant diagrams for the instruments covered in this document.

Chapter Overview

This chapter consists of the following sections:

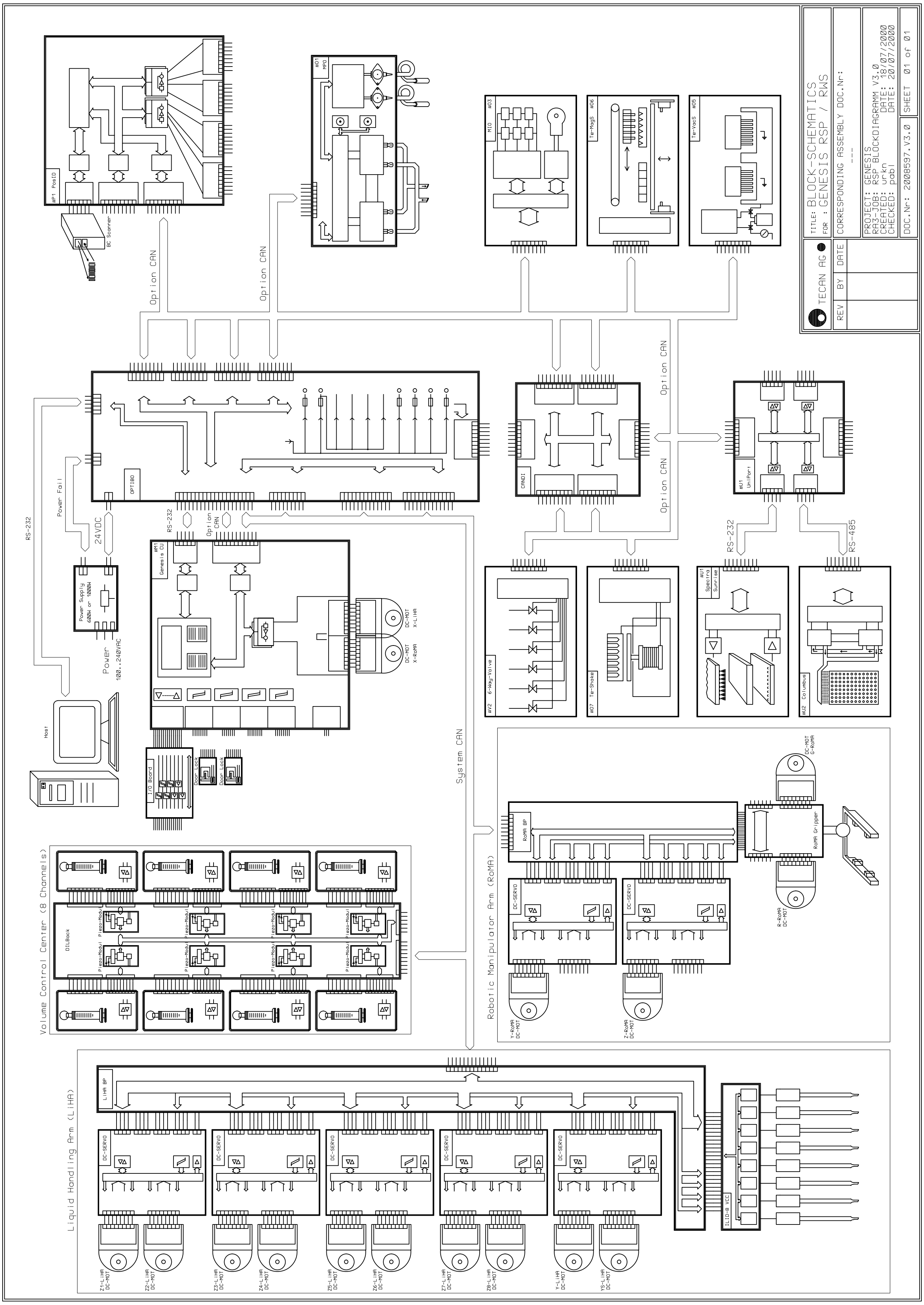
Section	Title	Page
9.1	Genesis RSP, RMP and RWS	9 – 1
9.2	Instrument	9 – 5
9.2.1	Power Modules	9 – 5
9.2.2	Electronic Boards	9 – 12
9.3	Liquid System	9 – 40
9.3.1	MPO/FWO	9 – 40
9.3.2	Diluter/Dilback	9 – 44
9.3.3	Low Volume Option	9 – 48
9.4	LiHa 1 and LiHa 2	9 – 51
9.5	RoMa 1 and RoMa 2	9 – 56
9.6	PosID 1 and PosID 2	9 – 64

9.1 Genesis RSP, RMP and RWS

Find the following diagrams filed hereafter:

Drawing No	Title	Valid for	Page
2008597 V3.0 p.1	Block schematics	RSP, RWS	9 – 2
2010302 V1.0 p.1	Block schematics	RMP with TOPS 3.01	9 – 3
2010301 V1.0 p.1	Communication overview	RSP, RWS, RMP	9 – 4

2008597 V3.0 p.1 Block schematics



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FOR : GENESIS RSP / RWS
CORRESPONDING ASSEMBLY DOC.Nr:

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CREATED: urkn DATE: 18/07/2000
CHECKED: pabl DATE: 20/07/2000
DOC.Nr: 2008597.V3.0
SHEET 01 of 01
TECAN AG
REV BY DATE

#P1 PosID
BC Scanner
Option CAN
Option CAN
#01 MPO
MIO #03
Te-MagS #06
Te-VacS #05
Option CAN
Option CAN
CANDI
#U1 UniPort
RS-232
Power Fail
24VDC
OPTIBO
RS-232
Option CAN
Power Supply 600W or 1000W
Power 100..240VAC
#M1 Genesis CU
DC-MOT X-LiHA
DC-MOT X-RoMA
Host
I/O Board
Door Lock
Door Lock
System CAN
RS-232
RS-485
#V2 6-Way-Valve
#07 Te-Shake
#U1 Spectra Sunrise
#U2 Columbus
DC-MOT G-RoMA
RoMA BP
RoMA Gripper
DC-SERVO
DC-SERVO
R-RoMA DC-MOT
Y-RoMA DC-MOT
Z-RoMA DC-MOT
Robotic Manipulator Arm (RoMA)
Volume Control Center (8 Channels)
DILBack
Piezo-Modul
Piezo-Modul
Piezo-Modul
Piezo-Modul
Piezo-Modul
Piezo-Modul
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LiHA BP
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Z2-LiHA DC-MOT
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Z6-LiHA DC-MOT
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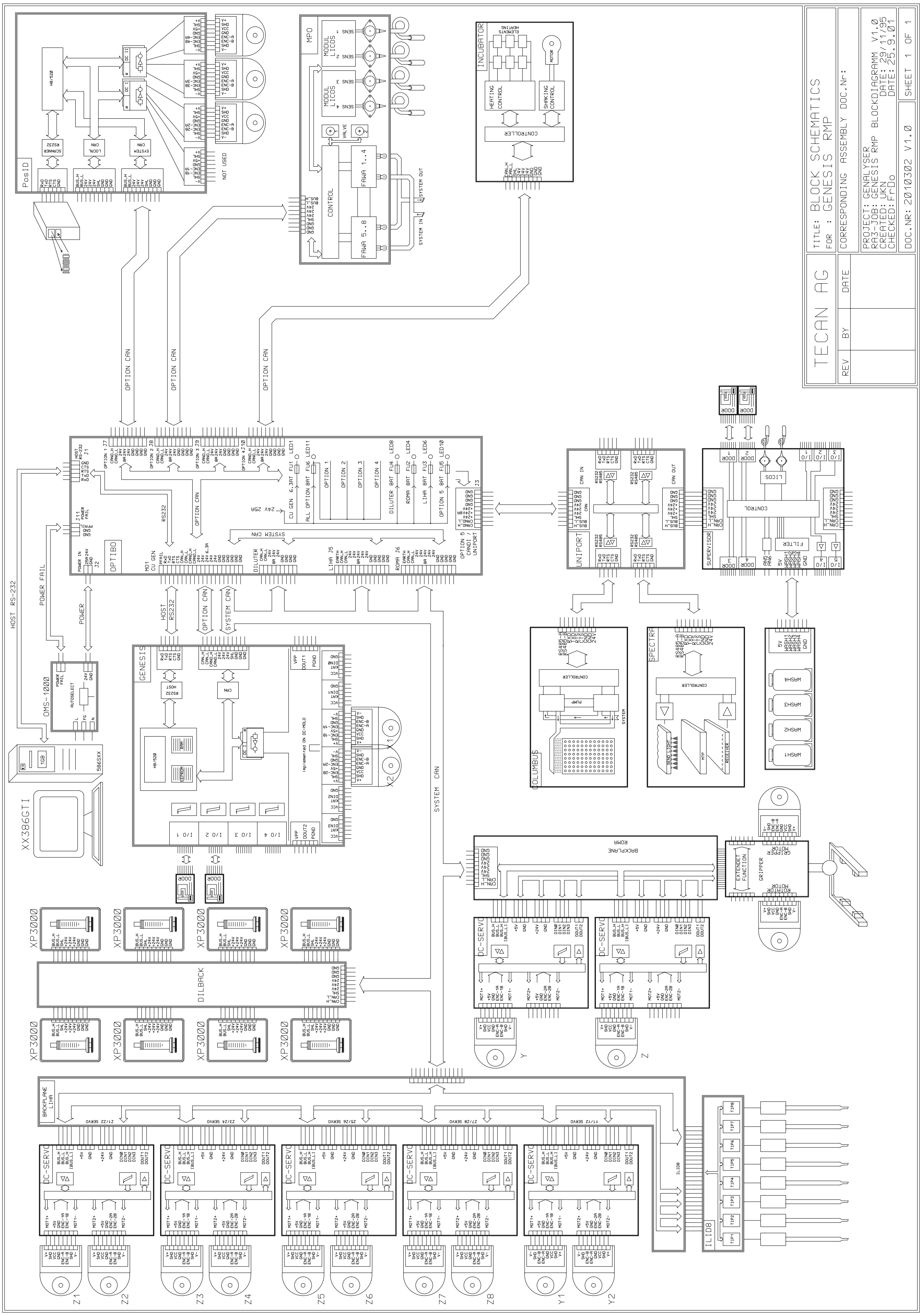
Y-LiHA DC-MOT
YS-LiHA DC-MOT

2010302 V1.0 p.1 Block schematics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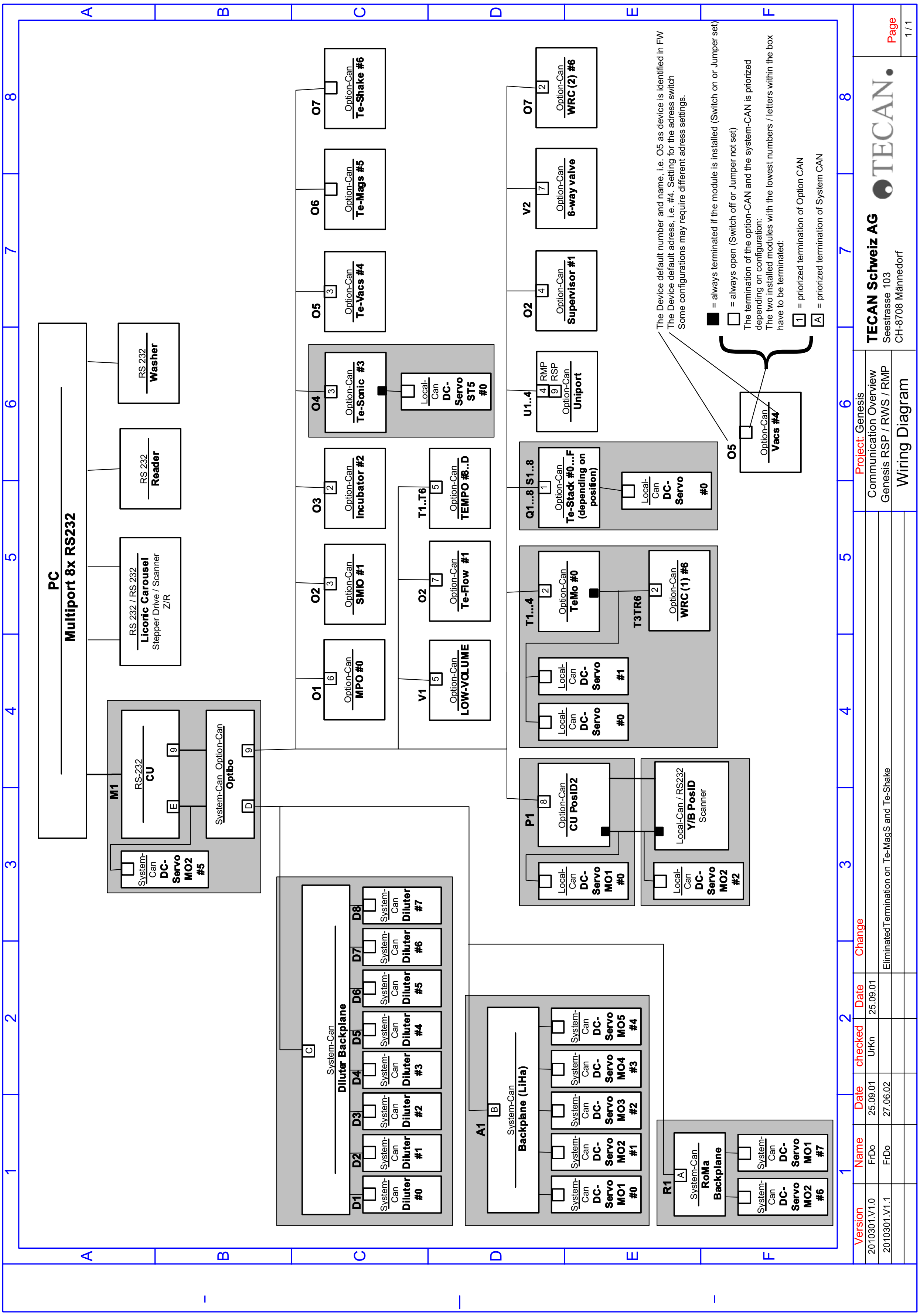
CONTROL
FAWA 1..4
FAWA 5..8
SYSTEM OUT
SYSTEM IN
INCUBATOR
HEATING ELEMENTS
MOTOR
HEATING CONTROL
SHAKING CONTROL
CONTROLLER
OPTION CAN
OPTION CAN
OPTION CAN
OPTIBO
SYSTEM CAN
24V 25A
DILUTER
LIHA J5
ROMA J6
HOST RS-232
POWER FAIL
POWER
HOST RS232
OPTION CAN
SYSTEM CAN
OMS-1000
AUTOSELECT
586SXX
XX386GTI
GENESIS
Implemented on DC-MOLO
I/O 1
I/O 2
I/O 3
I/O 4
DOOR
DOOR
UNIPORT
CAN IN
CAN OUT
SUPERVISOR
DOOR
LICOS
CONTROL
FILTER
COLUMBUS
CONTROLLER
PUMP
SYSTEM
SPECTRA
CONTROLLER
MTP
RECEIVER
WASH1
WASH2
WASH3
WASH4
BACKPLANE ROMA
EXTENDET FUNCTION
GRIPPER
GRIPPER MOTOR
ROTATOR MOTOR
SYSTEM CAN
XP3000
XP3000
XP3000
XP3000
DILBACK
XP3000
XP3000
XP3000
XP3000
DC-SERVO
DC-SERVO
Y
Z
BACKPLANE LIHA
Z1/Z2 SERVO
Z3/Z4 SERVO
Z5/Z6 SERVO
Z7/Z8 SERVO
Y1/Y2 SERVO
DC-SERVO
DC-SERVO
DC-SERVO
DC-SERVO
DC-SERVO
ILID8
TIP1
TIP2
TIP3
TIP4
TIP5
TIP6
TIP7
TIP8
Z1
Z2
Z3
Z4
Z5
Z6
Z7
Z8
Y1
Y2

2010301 V1.0 p.1 Communication overview


PC
Multiport 8x RS232
RS 232
Washer
RS 232
Reader
RS 232 / RS 232
Licoric Carousel
Stepper Drive / Scanner
Z/R
M1
RS-232
CU
9
E
System-Can Option-Can
Optibo
9
D
System-Can
DC-Servo
MO2
#5
O1
6
Option-Can
MPO #0
O2
3
Option-Can
SMO #1
O3
2
Option-Can
Incubator #2
O4
3
Option-Can
Te-Sonic #3
Local-Can
DC-Servo
ST5
#0
O5
3
Option-Can
Te-Vacs #4
O6
Option-Can
Te-Mags #5
O7
Option-Can
Te-Shake #6
V1
5
Option-Can
LOW-VOLUME
O2
7
Option-Can
Te-Flow #1
T1..T6
5
Option-Can
TEMPO #8..D
T1...4
2
Option-Can
TeMo #0
T3TR6
2
Option-Can
WRC (1) #6
Local-Can
DC-Servo
#1
Local-Can
DC-Servo
#0
Q1...8 S1..8
1
Option-Can
Te-Stack #0...F
(depending on position)
Local-Can
DC-Servo
#0
U1..4
4 RMP
9 RSP
Option-Can
Uniport
O2
4
Option-Can
Supervisor #1
V2
7
Option-Can
6-way valve
O7
2
Option-Can
WRC (2) #6
O5
Option-Can
Vacs #4
P1
8
Option-Can
CU PosID2
Local-Can
DC-Servo
MO1
#0
Local-Can / RS232
Y/B PosID
Scanner
Local-Can
DC-Servo
MO2
#2
C
System-Can
Diluter Backplane
D1
D2
D3
D4
D5
D6
D7
D8
System-Can
Diluter
#0
#1
#2
#3
#4
#5
#6
#7
A1
B
System-Can
Backplane (LiHa)
System-Can
DC-Servo
MO1 #0
MO2 #1
MO3 #2
MO4 #3
MO5 #4
R1
A
System-Can
RoMa
Backplane
System-Can
DC-Servo
MO1
#7
MO2
#6
A B C D E F
1 2 3 4 5 6 7 8
Project: Genesis
Communication Overview
Genesis RSP / RWS / RMP
Wiring Diagram
TECAN Schweiz AG
Seestrasse 103
CH-8708 Männedorf
TECAN
Page
1 / 1
Version
Name
Date
checked
Date
Change
2010301.V1.0
FrDo
25.09.01
UrKn
25.09.01
2010301.V1.1
FrDo
27.06.02
EliminatedTermination on Te-MagS and Te-Shake

The Device default number and name, i.e. O5 as device is identified in FW
The Device default adress, i.e. #4. Setting for the adress switch
Some configurations may require different adress settings.

■ = always terminated if the module is installed (Switch on or Jumper set)

☐ = always open (Switch off or Jumper not set)

The termination of the option-CAN and the system-CAN is priorized depending on configuration:
The two installed modules with the lowest numbers / letters within the box have to be terminated:

1 = priorized termination of Option CAN

A = priorized termination of System CAN

9.2 Instrument

9.2.1 Power Modules

Find the following diagrams filed hereafter:

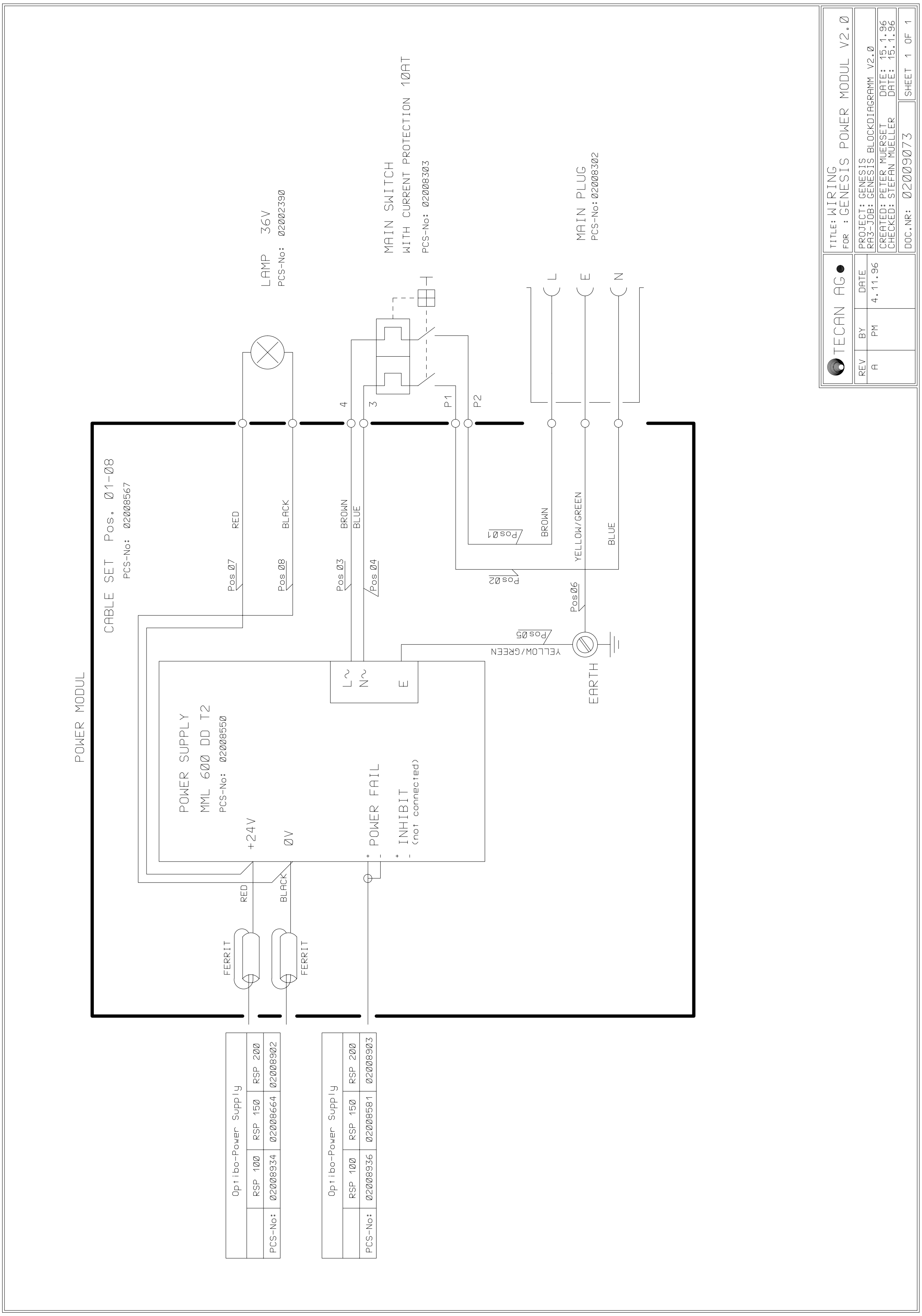
Old Generation

Drawing No	Title	Valid for	Page
2009073 V2.0	Wiring diagram	RSP RWS 100	9 – 6
2008920 V1.1	Wiring diagram	RMP	9 – 7
2009559 V1.0	Wiring diagram	RWS 150/200	9 – 8

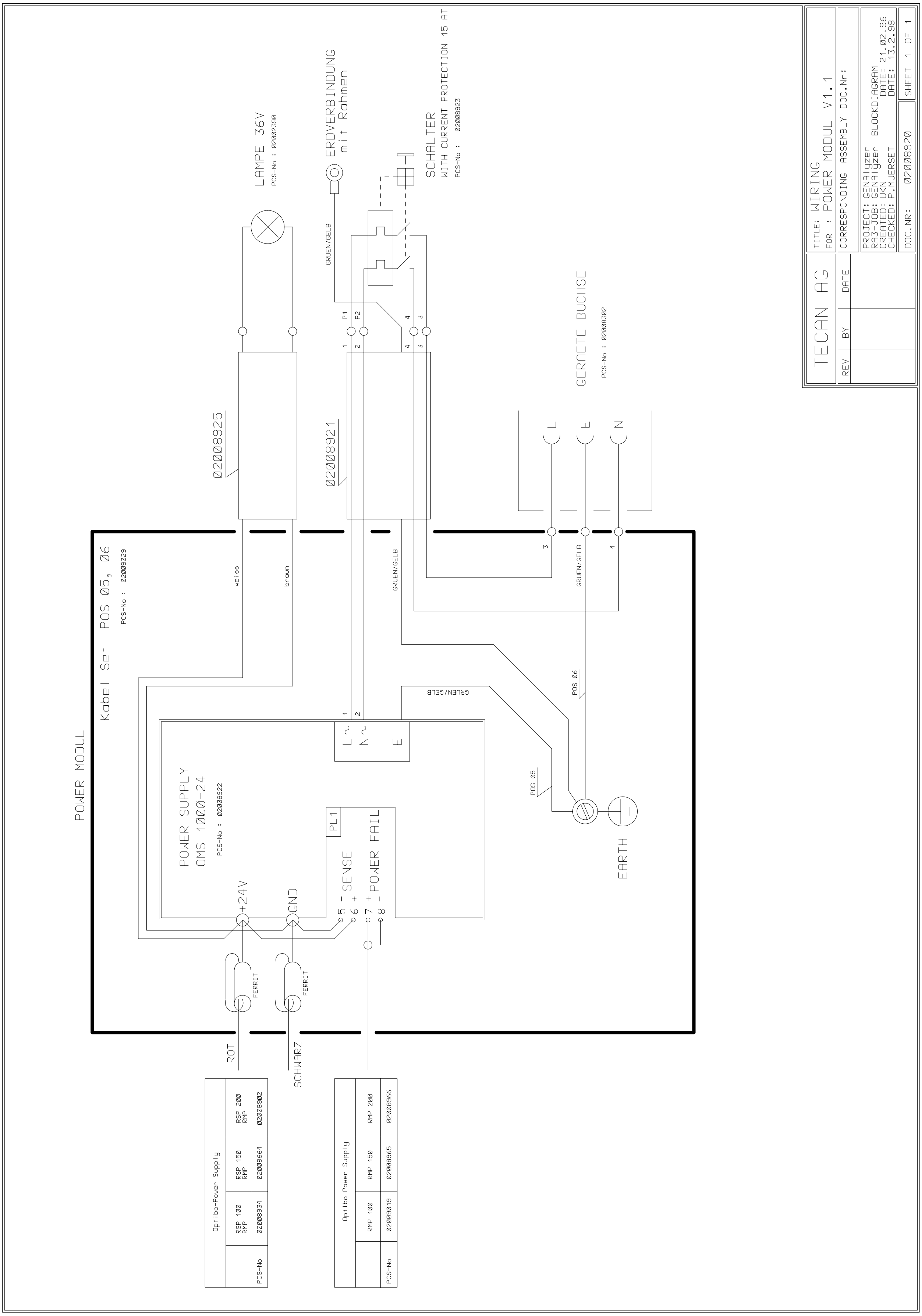
PM 1, 2, 3 and 4

Drawing No	Title	Valid for	Page
2010233 V2.0	Wiring diagram	RSP/RWS 100 (PM 1) RSP 150/200 (PM 4)	9 – 9
2010235 V2.0	Wiring diagram	RMP (PM 3)	9 – 10
2010234 V2.0	Wiring diagram	RWS 150/200 (PM 2)	9 – 11

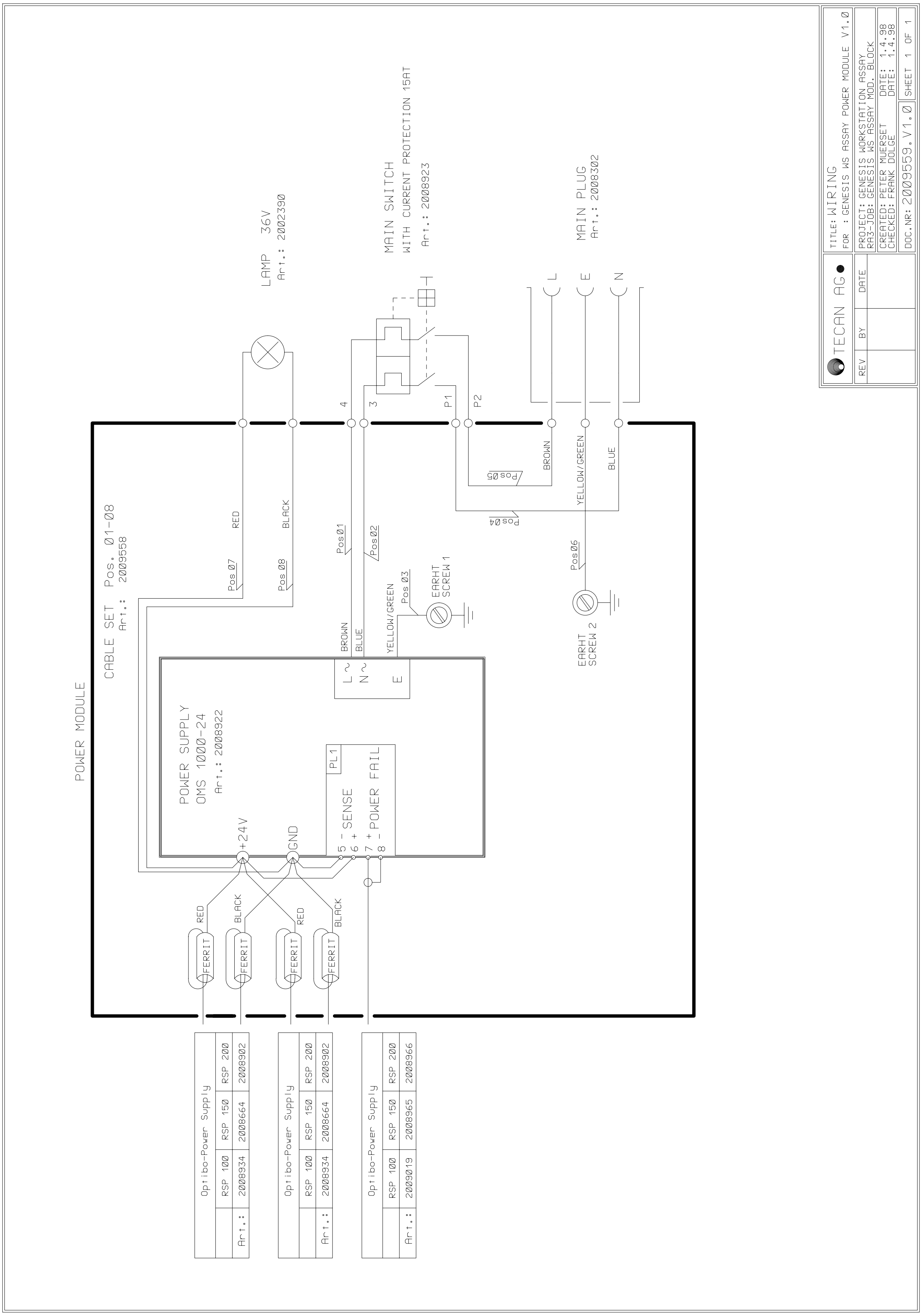
2009073 V2.0 Wiring diagram


POWER MODUL
CABLE SET Pos. 01-08
PCS-No: 02008567
LAMP 36V
PCS-No: 02002390
MAIN SWITCH
WITH CURRENT PROTECTION 10AT
PCS-No: 02008303
MAIN PLUG
PCS-No: 02008302
L
E
N
4
3
P1
P2
RED
BLACK
BROWN
BLUE
BROWN
YELLOW/GREEN
BLUE
Pos07
Pos08
Pos03
Pos04
Pos01
Pos02
Pos06
Pos05
YELLOW/GREEN
EARTH
POWER SUPPLY
MML 600 DD T2
PCS-No: 02008550
L~
N~
E
+24V
0V
POWER FAIL
INHIBIT
(not connected)
+
-
+
-
RED
BLACK
FERRIT
FERRIT
Optibo-Power Supply
RSP 100
RSP 150
RSP 200
PCS-No:
02008934
02008664
02008902
Optibo-Power Supply
RSP 100
RSP 150
RSP 200
PCS-No:
02008936
02008581
02008903
TECAN AG
REV
BY
DATE
A
PM
4.11.96
TITLE: WIRING
FOR : GENESIS POWER MODUL V2.0
PROJECT: GENESIS
RA3-JOB: GENESIS BLOCKDIAGRAMM V2.0
CREATED: PETER MUERSET DATE: 15.1.96
CHECKED: STEFAN MUELLER DATE: 15.1.96
DOC.NR: 02009073
SHEET 1 OF 1

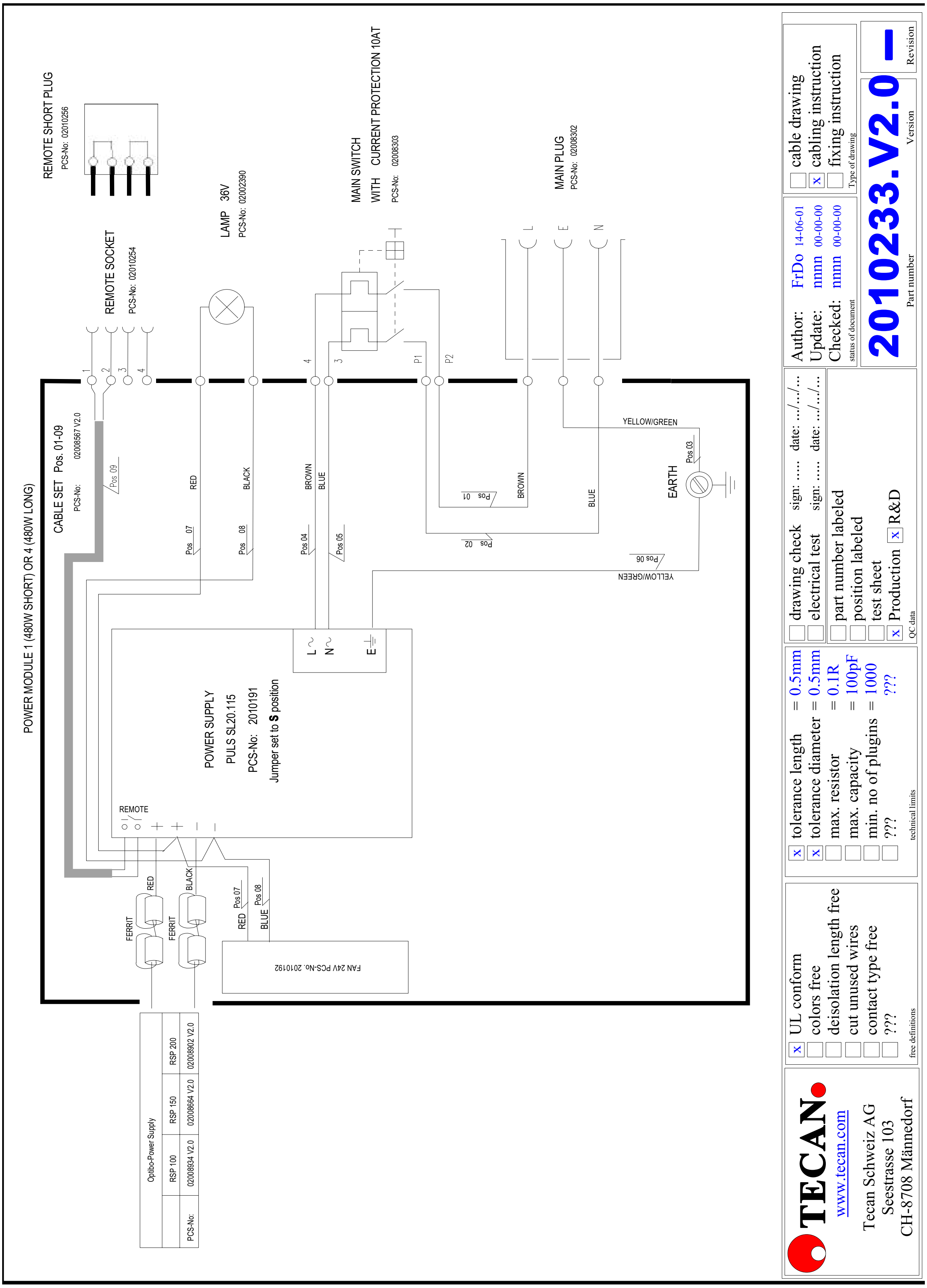
2008920 V1.1 Wiring diagram


LAMPE 36V
PCS-No : 02002390
ERDVERBINDUNG
mit Rahmen
GRUEN/GELB
SCHALTER
WITH CURRENT PROTECTION 15 AT
PCS-No : 02008923
P1
P2
4
3
1
2
4
3
02008925
02008921
GERAETE-BUCHSE
PCS-No : 02008302
L
E
N
POWER MODUL
Kabel Set POS 05, 06
PCS-No : 02009029
weiss
braun
GRUEN/GELB
3
GRUEN/GELB
4
POS 06
GRUEN/GELB
1
2
L ~
N ~
E
POS 05
EARTH
POWER SUPPLY
OMS 1000-24
PCS-No : 02008922
PL1
+24V
GND
5 - SENSE
6 +
7 + POWER FAIL
8 -
FERRIT
FERRIT
ROT
SCHWARZ
Optibo-Power Supply
RSP 100 RMP
RSP 150 RMP
RSP 200 RMP
PCS-No
02008934
02008664
02008902
Optibo-Power Supply
RMP 100
RMP 150
RMP 200
PCS-No
02009019
02008965
02008966
TECAN AG
REV
BY
DATE
TITLE: WIRING
FOR : POWER MODUL V1.1
CORRESPONDING ASSEMBLY DOC.Nr:
PROJECT: GENAlyzer
RA3-JOB: GENAlyzer BLOCKDIAGRAM
CREATED: UKN DATE: 21.02.96
CHECKED: P.MUERSET DATE: 13.2.98
DOC.NR: 02008920
SHEET 1 OF 1

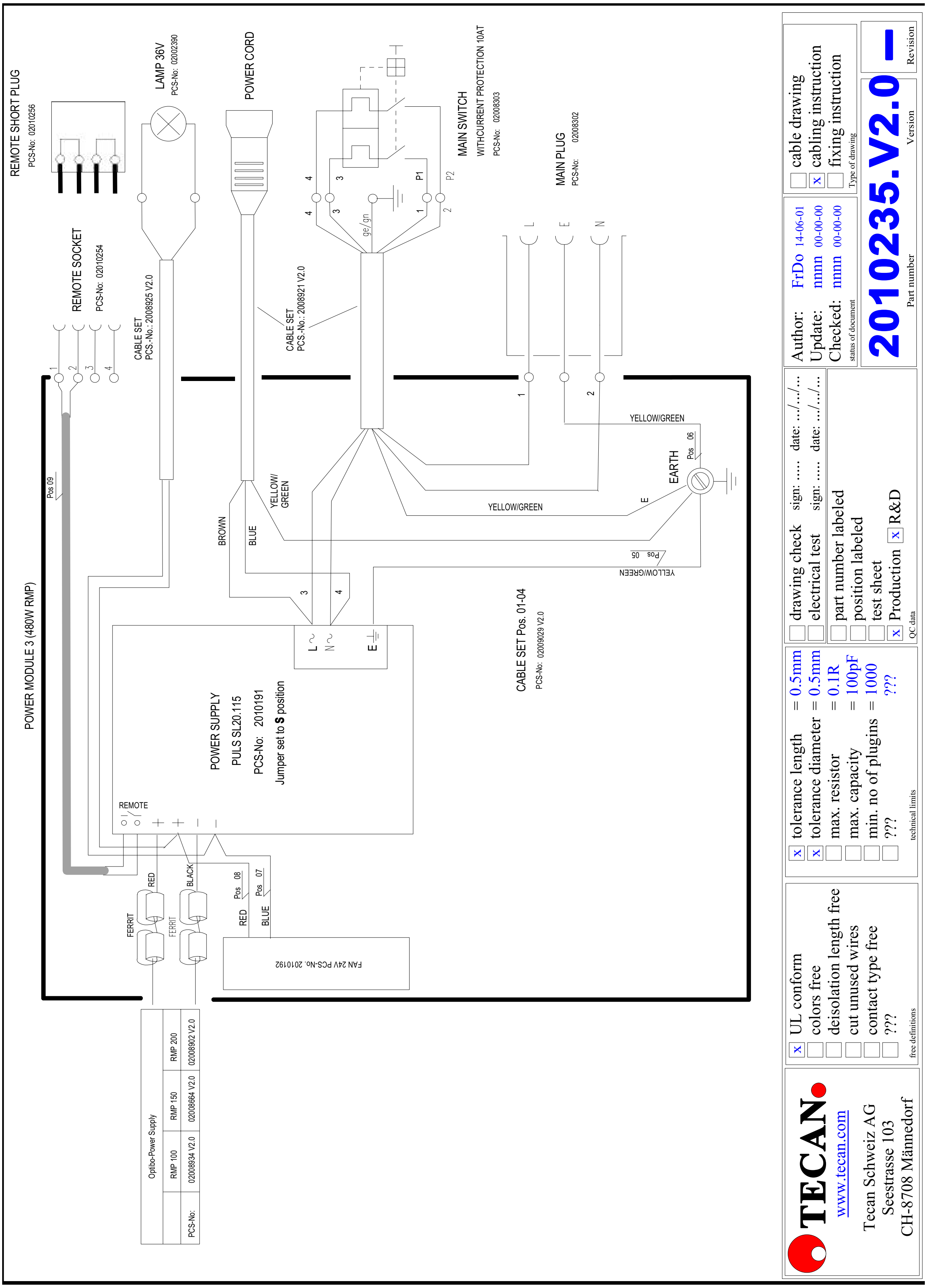
2009559 V1.0 Wiring diagram


TITLE: WIRING
FOR : GENESIS WS ASSAY POWER MODULE V1.0
PROJECT: GENESIS WORKSTATION ASSAY
RA3-JOB: GENESIS WS ASSAY MOD. BLOCK
CREATED: PETER MUERSET DATE: 1.4.98
CHECKED: FRANK DOLGE DATE: 1.4.98
DOC.NR: 2009559.V1.0
SHEET 1 OF 1
TECAN AG
REV
BY
DATE
LAMP 36V
Art.: 2002390
MAIN SWITCH
WITH CURRENT PROTECTION 15AT
Art.: 2008923
MAIN PLUG
Art.: 2008302
L
E
N
4
3
P1
P2
BROWN
YELLOW/GREEN
BLUE
Pos05
Pos04
Pos06
RED
BLACK
Pos.07
Pos.08
Pos01
Pos02
Pos.03
EARHT SCREW 1
EARHT SCREW 2
CABLE SET Pos. 01-08
Art.: 2009558
POWER MODULE
BROWN
BLUE
YELLOW/GREEN
L ~
N ~
E
POWER SUPPLY
OMS 1000-24
Art.: 2008922
PL1
5 - SENSE
6 +
7 + POWER FAIL
8 -
+24V
GND
RED
BLACK
RED
BLACK
FERRIT
FERRIT
FERRIT
FERRIT
Optibo-Power Supply
RSP 100 RSP 150 RSP 200
Art.: 2008934 2008664 2008902
Optibo-Power Supply
RSP 100 RSP 150 RSP 200
Art.: 2008934 2008664 2008902
Optibo-Power Supply
RSP 100 RSP 150 RSP 200
Art.: 2009019 2008965 2008966

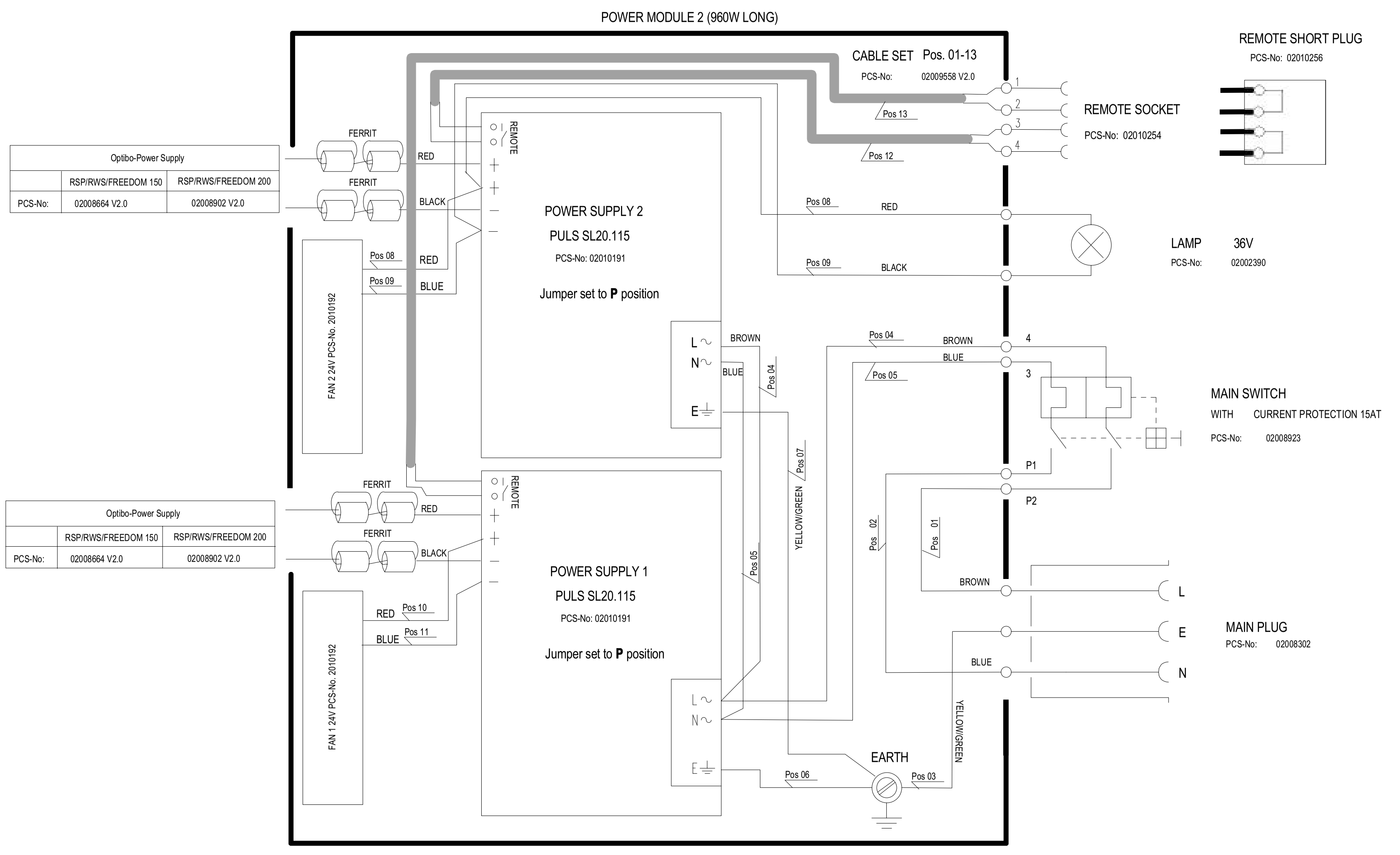
2010233 V2.0 Wiring diagram


REMOTE SHORT PLUG
PCS-No: 02010256
REMOTE SOCKET
PCS-No: 02010254
LAMP 36V
PCS-No: 02002390
MAIN SWITCH
WITH CURRENT PROTECTION 10AT
PCS-No: 02008303
MAIN PLUG
PCS-No: 02008302
L
E
N
1
2
3
4
P1
P2
POWER MODULE 1 (480W SHORT) OR 4 (480W LONG)
CABLE SET Pos. 01-09
PCS-No: 02008567 V2.0
Pos 09
RED
BLACK
BROWN
BLUE
Pos 07
Pos 08
Pos 04
Pos 05
Pos 01
Pos 02
Pos 03
Pos 06
BROWN
BLUE
YELLOW/GREEN
EARTH
YELLOW/GREEN
POWER SUPPLY
PULS SL20.115
PCS-No: 2010191
Jumper set to S position
REMOTE
+ + - -
L
N
E
FERRIT
FERRIT
RED
BLACK
RED
BLUE
Pos 07
Pos 08
FAN 24V PCS-No. 2010192
Optibo-Power Supply
RSP 100
RSP 150
RSP 200
PCS-No:
02008934 V2.0
02008664 V2.0
02008902 V2.0
TECAN
www.tecan.com
Tecan Schweiz AG
Seestrasse 103
CH-8708 Männedorf
☒ UL conform
☐ colors free
☐ deisolation length free
☐ cut unused wires
☐ contact type free
☐ ???
free definitions
☒ tolerance length = 0.5mm
☒ tolerance diameter = 0.5mm
☐ max. resistor = 0.1R
☐ max. capacity = 100pF
☐ min. no of plugins = 1000
☐ ??? ???
technical limits
☐ drawing check sign: ..... date: .../.../...
☐ electrical test sign: ..... date: .../.../...
☐ part number labeled
☐ position labeled
☐ test sheet
☒ Production ☒ R&D
QC data
Author: FrDo 14-06-01
Update: mmm 00-00-00
Checked: mmm 00-00-00
status of document
☐ cable drawing
☒ cabling instruction
☐ fixing instruction
Type of drawing
2010233
Part number
V2.0
Version
-
Revision

2010235 V2.0 Wiring diagram


REMOTE SHORT PLUG
PCS-No: 02010256
REMOTE SOCKET
PCS-No: 02010254
LAMP 36V
PCS-No: 02002390
CABLE SET
PCS.-No.: 2008925 V2.0
POWER CORD
CABLE SET
PCS.-No.: 2008921 V2.0
MAIN SWITCH
WITHCURRENT PROTECTION 10AT
PCS-No: 02008303
MAIN PLUG
PCS-No: 02008302
L
E
N
P1
P2
ge/gn
YELLOW/GREEN
EARTH
Pos 06
Pos 05
Pos 09
Pos 08
Pos 07
BROWN
BLUE
YELLOW/ GREEN
POWER MODULE 3 (480W RMP)
CABLE SET Pos. 01-04
PCS-No: 02009029 V2.0
POWER SUPPLY
PULS SL20.115
PCS-No: 2010191
Jumper set to S position
REMOTE
RED
BLACK
FERRIT
FAN 24V PCS-No. 2010192
Optibo-Power Supply
PCS-No:
RMP 100
02008934 V2.0
RMP 150
02008664 V2.0
RMP 200
02008902 V2.0
TECAN
www.tecan.com
Tecan Schweiz AG
Seestrasse 103
CH-8708 Männedorf
☒ UL conform
☐ colors free
☐ deisolation length free
☐ cut unused wires
☐ contact type free
☐ ???
free definitions
☒ tolerance length = 0.5mm
☒ tolerance diameter = 0.5mm
☐ max. resistor = 0.1R
☐ max. capacity = 100pF
☐ min. no of plugins = 1000
☐ ??? ???
technical limits
☐ drawing check sign: ..... date: .../.../...
☐ electrical test sign: ..... date: .../.../...
☐ part number labeled
☐ position labeled
☐ test sheet
☒ Production ☒ R&D
QC data
Author: FrDo 14-06-01
Update: mmm 00-00-00
Checked: mmm 00-00-00
status of document
☐ cable drawing
☒ cabling instruction
☐ fixing instruction
Type of drawing
2010235
Part number
V2.0
Version
–
Revision

2010234 V2.0 Wiring diagram


POWER MODULE 2 (960W LONG)
CABLE SET Pos. 01-13
PCS-No: 02009558 V2.0
REMOTE SHORT PLUG
PCS-No: 02010256
REMOTE SOCKET
PCS-No: 02010254
1
2
3
4
Pos 13
Pos 12
LAMP 36V
PCS-No: 02002390
Pos 08
RED
Pos 09
BLACK
MAIN SWITCH
WITH CURRENT PROTECTION 15AT
PCS-No: 02008923
4
3
P1
P2
Pos 04
BROWN
BLUE
Pos 05
Pos 02
Pos 01
BROWN
BLUE
MAIN PLUG
PCS-No: 02008302
L
E
N
YELLOW/GREEN
EARTH
Pos 03
Pos 06
Pos 07
YELLOW/GREEN
Pos 05
Pos 04
BROWN
BLUE
POWER SUPPLY 2
PULS SL20.115
PCS-No: 02010191
Jumper set to P position
REMOTE
L ~
N ~
E
POWER SUPPLY 1
PULS SL20.115
PCS-No: 02010191
Jumper set to P position
REMOTE
L ~
N ~
E
FERRIT
RED
FERRIT
BLACK
Pos 08
RED
Pos 09
BLUE
FAN 2 24V PCS-No. 2010192
FERRIT
RED
FERRIT
BLACK
RED
Pos 10
BLUE
Pos 11
FAN 1 24V PCS-No. 2010192
Optibo-Power Supply
RSP/RWS/FREEDOM 150
RSP/RWS/FREEDOM 200
PCS-No: 02008664 V2.0
02008902 V2.0
Optibo-Power Supply
RSP/RWS/FREEDOM 150
RSP/RWS/FREEDOM 200
PCS-No: 02008664 V2.0
02008902 V2.0

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Seestrasse 103
CH-8708 Männedorf

☒ UL conform
☐ colors free
☐ deisolation length free
☐ cut unused wires
☐ contact type free
☐ ???
free definitions

☒ tolerance length = 0.5mm
☒ tolerance diameter = 0.5mm
☐ max. resistor = 0.1R
☐ max. capacity = 100pF
☐ min. no of plugins = 1000
☐ ??? ???
technical limits

☐ drawing check sign: ..... date: .../.../...
☐ electrical test sign: ..... date: .../.../...
☐ part number labeled
☐ position labeled
☐ test sheet
☒ Production ☒ R&D
QC data

Author: FrDo 14-06-01
Update: nnnn 00-00-00
Checked: nnnn 00-00-00
status of document

☐ cable drawing
☒ cabling instruction
☐ fixing instruction
Type of drawing

2010234.V2.0 **–**
Part number Version Revision

9.2.2 Electronic Boards

Find the following diagrams filed hereafter:

Optibo, Optibo Power

Drawing No	Title	Valid for	Page
2008908 V2.0A	Schematics	Optibo	9 – 14
2008908 V2.0C	Assembly component side	Optibo	9 – 15
2008908 V2.0C	Assembly solder side	Optibo	9 – 16
2009554 V2.1B	Schematics	Optibo Power	9 – 17
2009554 V2.1B	Assembly component side	Optibo Power	9 – 18
2009554 V2.1B	Assembly solder side	Optibo Power	9 – 19

CU Board

Drawing No	Title	Valid for	Page
2008996 V2.0B p.1	Schematics	CU board	9 – 20
2008996 V2.0B p.2	Schematics	CU board	9 – 21
2008996 V2.0B p.1	Assembly component side	CU board	9 – 22

DC-Servo Board

Drawing No	Title	Valid for	Page
2008980 V.2.0A	Schematics	DC-Servo board	9 – 23
2008980 V.2.0A	Assembly upper side	DC-Servo board	9 – 24
2008980 V.2.0A	Assembly lower side	DC-Servo board	9 – 25

Supervisor Board

Drawing No	Title	Valid for	Page
2008798 V1.2B p.1	Schematics	Supervisor board	9 – 26
2008798 V1.2B p.2	Schematics	Supervisor board	9 – 27
2008798 V1.2B	Assembly component side	Supervisor board	9 – 28

Uniport Board

Drawing No	Title	Valid for	Page
2008557 V1.1B p.1	Schematics	Uniport board	9 – 29
2008557 V1.1B p.2	Schematics	Uniport board	9 – 30
2008557 V1.1B p.3	Schematics	Uniport board	9 – 31
2008557 V1.1B	Assembly component side	Uniport board	9 – 32
2008557 V1.1B	Assembly solder side	Uniport board	9 – 33

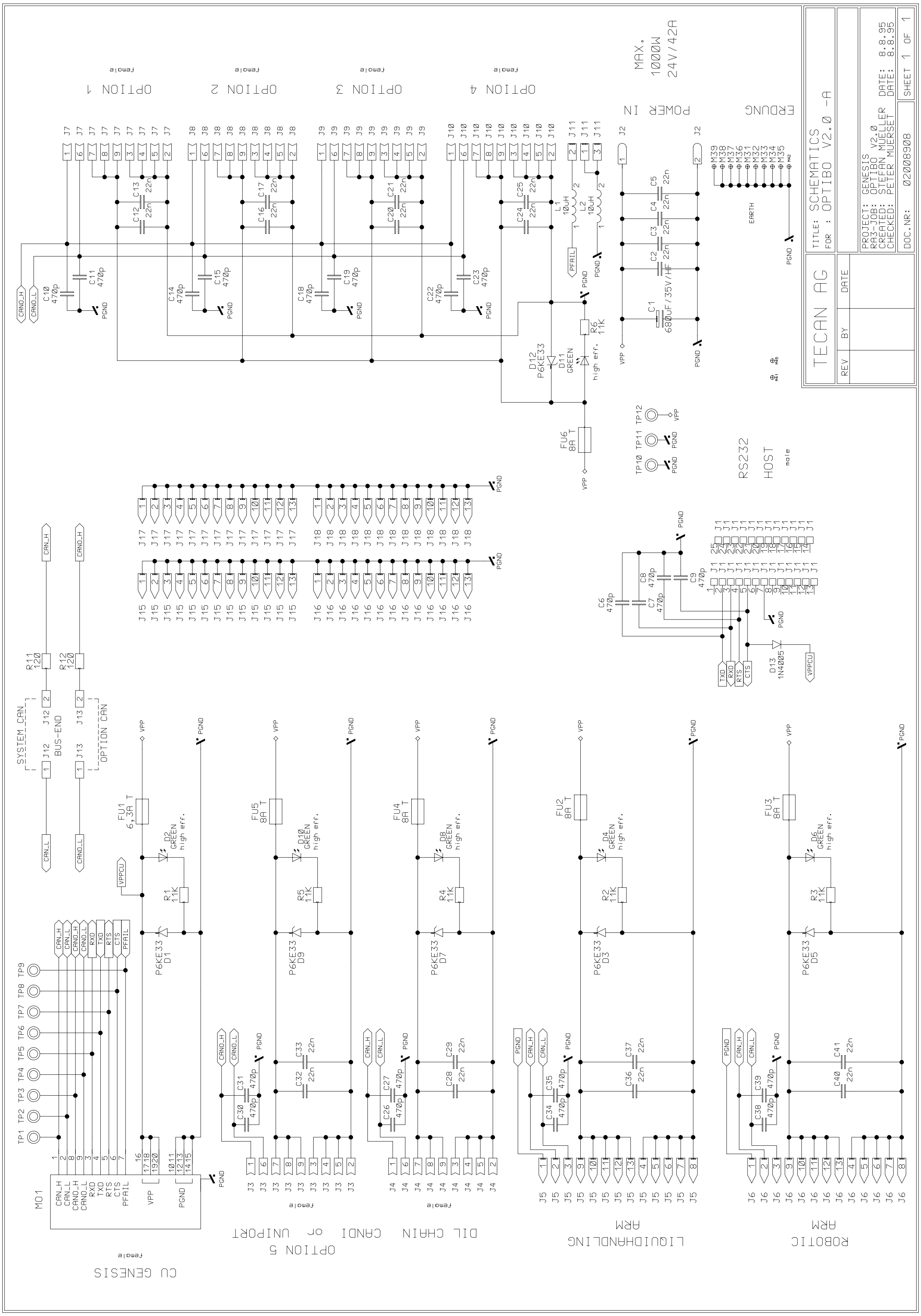
CANDI Board

Drawing No	Title	Valid for	Page
2009007 V.2.0A	Schematics	CANDI board	9 – 34
2009007 V.2.0A	Assembly component side	CANDI board	9 – 35

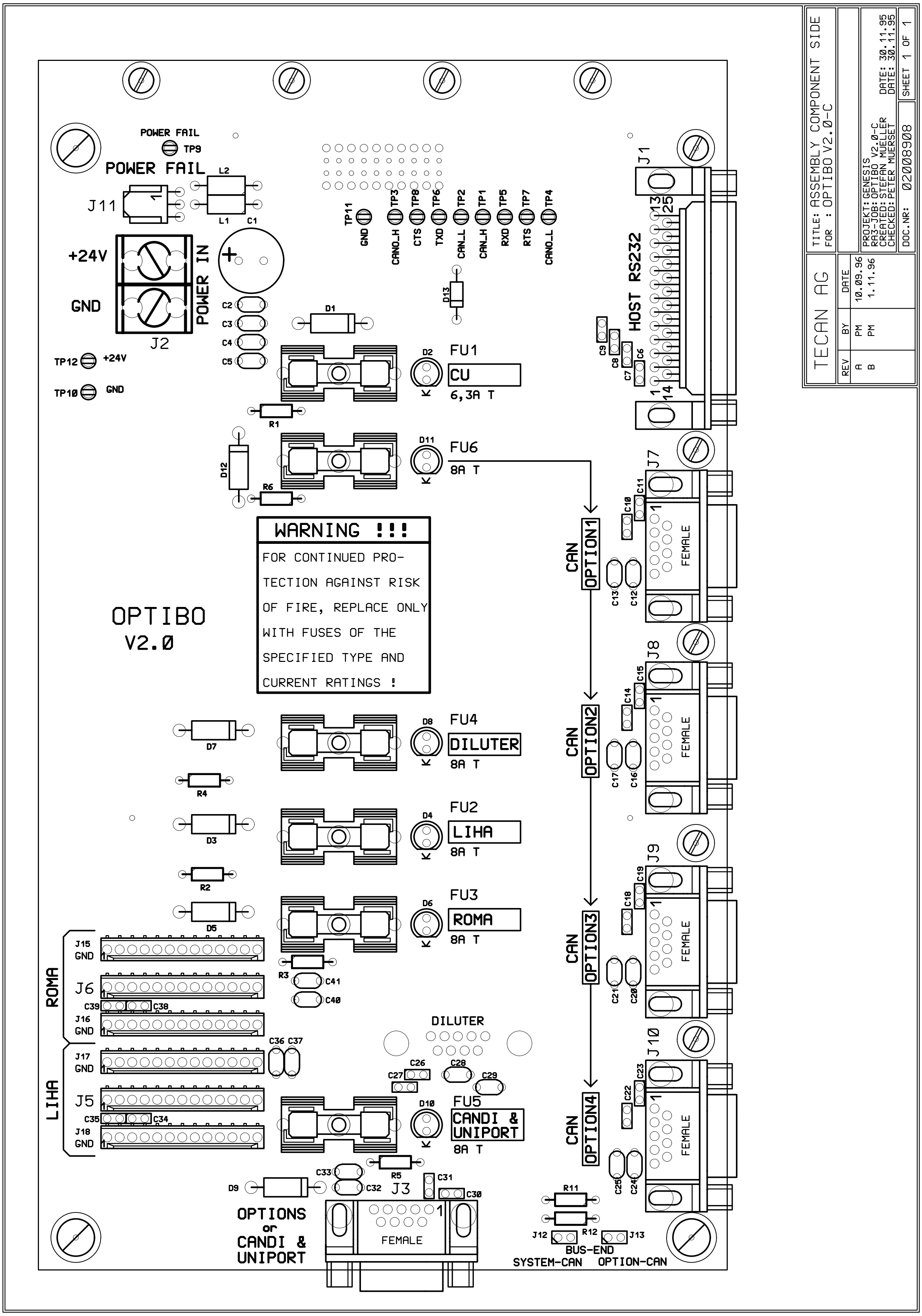
SMIO/SAFY

Drawing No	Title	Valid for	Page
2010219 V1.0	Block schematics	SMIO/SAFY	9 – 36
2010219 V1.0	Schematics	SMIO/SAFY	9 – 36
2009706V.1.2A p.2	Schematics	SMIO/SAFY	9 – 38
2009706 V.1.2A	Assembly	SMIO/SAFY	9 – 39

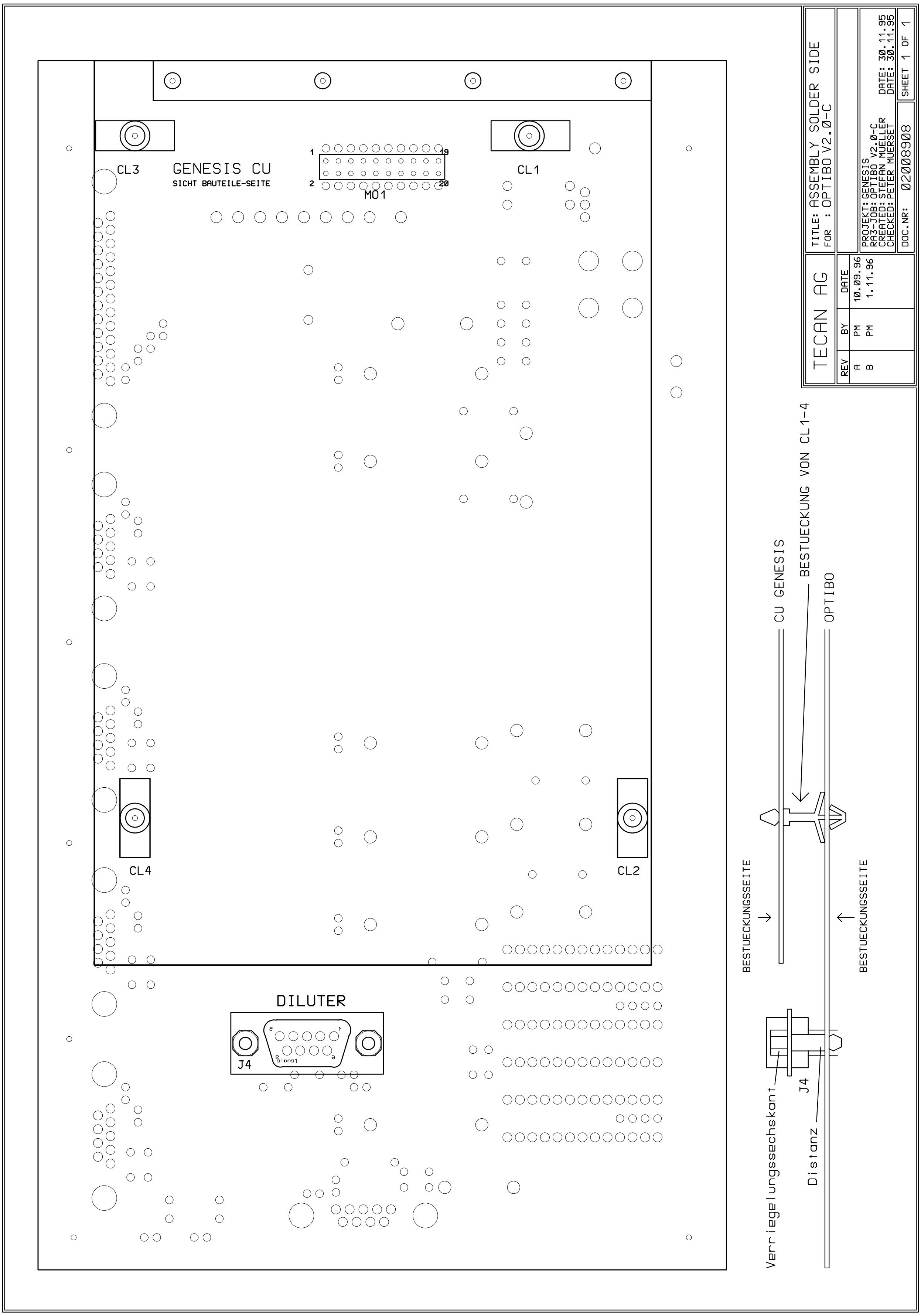
2008908 V2.0A Schematics


TITLE: SCHEMATICS
FOR : OPTIBO V2.0 -A
PROJECT: GENESIS
RA3-JOB: OPTIBO V2.0
CREATED: STEFAN MUELLER DATE: 8.8.95
CHECKED: PETER MUERSET DATE: 8.8.95
DOC.NR: 02008908
SHEET 1 OF 1
TECAN AG
REV
BY
DATE
OPTION 1
OPTION 2
OPTION 3
OPTION 4
female
POWER IN
MAX. 1000W 24V/42A
ERDUNG
EARTH
RS232 HOST
male
SYSTEM_CAN BUS-END
OPTION CAN
CU GENESIS
OPTION 5 CANDI or UNIPORT
DIL CHAIN
LIQUIDHANDLING ARM
ROBOTIC ARM
M01
VPP
PGND
VPPCU
PFAIL
CAN_H
CAN_L
CAN0_H
CAN0_L
TXD
RXD
RTS
CTS
FU1 6,3A T
FU2 8A T
FU3 8A T
FU4 8A T
FU5 8A T
FU6 8A T
P6KE33
GREEN high eff.
D13 1N4005
C1 680uF/35V/HF
L1 10uH
L2 10uH
R11 120
R12 120
TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8 TP9
TP10 TP11 TP12

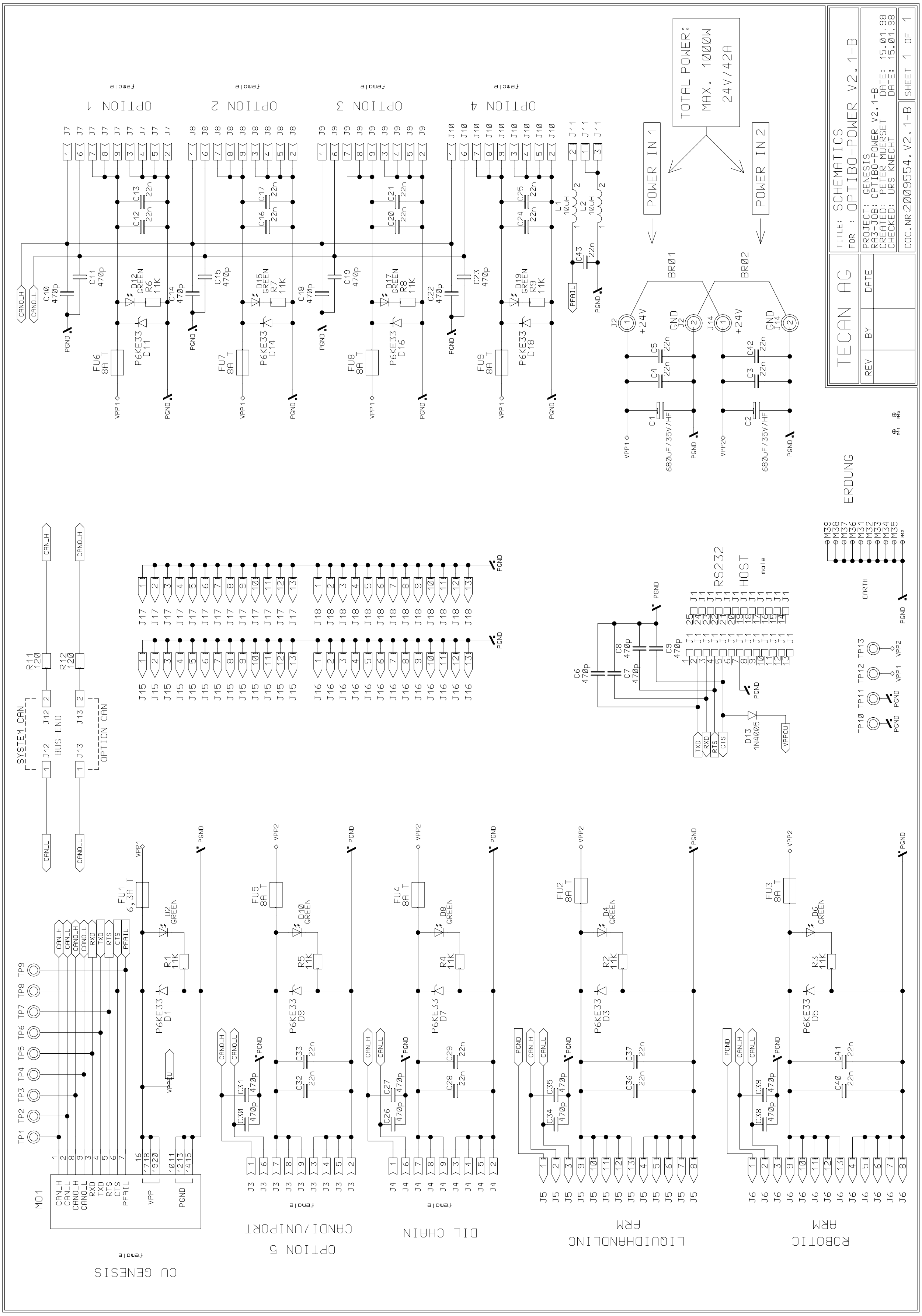
2008908 V2.0C Assembly component side


POWER FAIL
TP9
POWER FAIL
L2
L1
C1
J11
+24V
GND
POWER IN
J2
C2
C3
C4
C5
TP12
+24V
TP10
GND
TP11
GND
TP3
CAN0_H
TP8
CTS
TP6
TXD
TP2
CAN_L
TP1
CAN_H
TP5
RXD
TP7
RTS
TP4
CAN0_L
D13
D1
D2
FU1
CU
6,3A T
R1
D12
D11
FU6
8A T
R6
J1
13
25
HOST RS232
1
14
C9
C8
C7
C6
J7
C11
C10
1
FEMALE
CAN OPTION1
C13
C12
WARNING !!!
FOR CONTINUED PRO-
TECTION AGAINST RISK
OF FIRE, REPLACE ONLY
WITH FUSES OF THE
SPECIFIED TYPE AND
CURRENT RATINGS !
OPTIBO
V2.0
J8
C15
C14
1
FEMALE
CAN OPTION2
C17
C16
D7
D8
FU4
DILUTER
8A T
R4
D3
D4
FU2
LIHA
8A T
J9
C19
C18
1
FEMALE
CAN OPTION3
C21
C20
R2
D5
D6
FU3
ROMA
8A T
R3
C41
C40
ROMA
J15
GND
J6
C39
C38
J16
GND
LIHA
J17
GND
J5
C35
C34
J18
GND
C36 C37
DILUTER
C26
C28
C27
C29
D10
FU5
CANDI &
UNIPORT
8A T
J10
C23
C22
1
FEMALE
CAN OPTION4
C25
C24
R5
C31
C33
C32
J3
C30
1
D9
OPTIONS
or
CANDI &
UNIPORT
FEMALE
R11
R12
J12
J13
BUS-END
SYSTEM-CAN
OPTION-CAN
TITLE: ASSEMBLY COMPONENT SIDE
FOR : OPTIBO V2.0-C
TECAN AG
REV
BY
DATE
A
PM
10.09.96
B
PM
1.11.96
PROJEKT: GENESIS
RA3-JOB: OPTIBO V2.0-C
CREATED: STEFAN MUELLER
CHECKED: PETER MUERSET
DATE: 30.11.95
DATE: 30.11.95
DOC.NR: 02008908
SHEET 1 OF 1

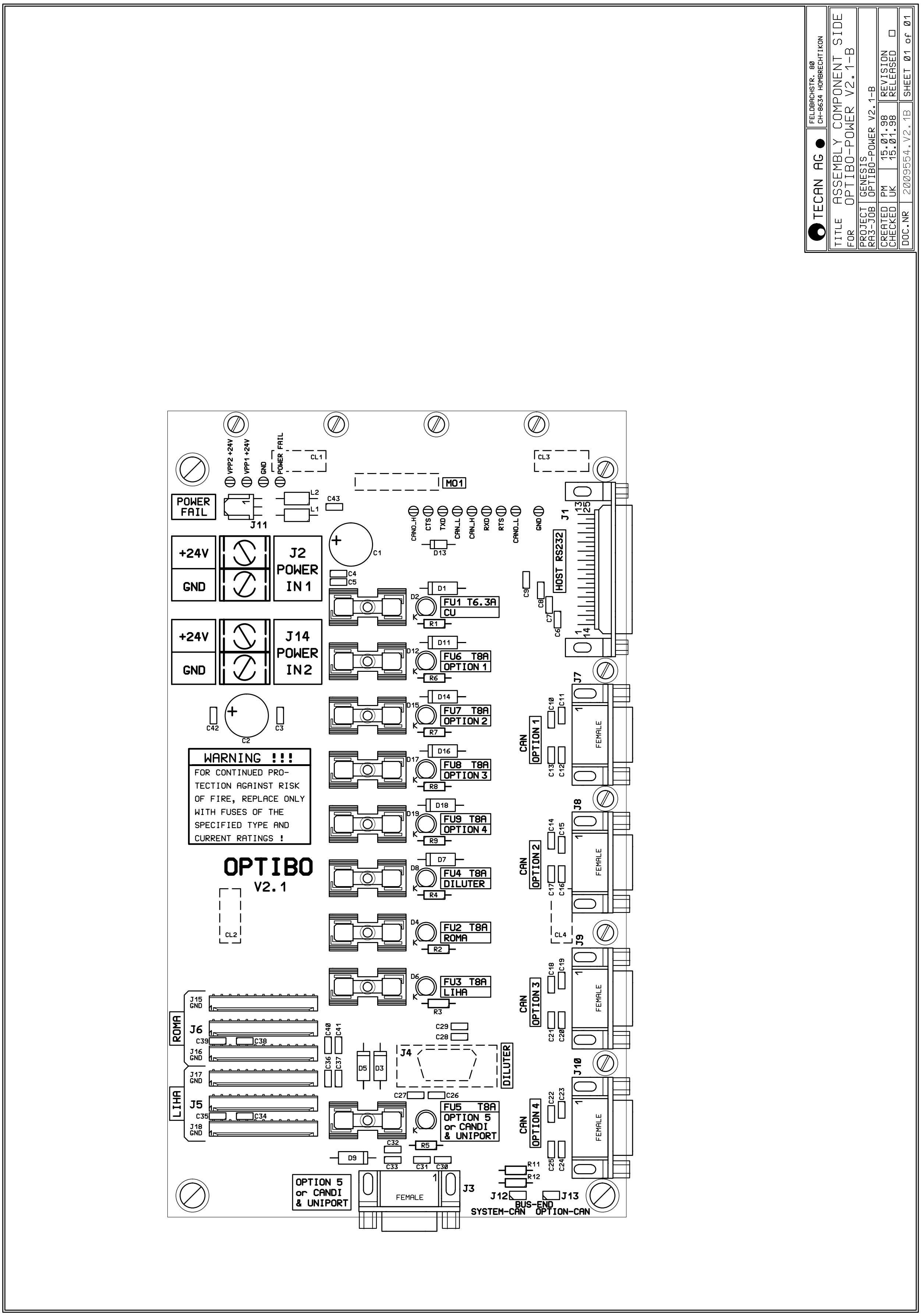
2008908 V2.0C Assembly solder side


CL3
GENESIS CU
SICHT BAUTEILE-SEITE
1
19
2
20
M01
CL1
CL4
CL2
DILUTER
J4
CU GENESIS
BESTUECKUNG VON CL1-4
OPTIBO
BESTUECKUNGSSEITE
BESTUECKUNGSSEITE
Verriegelungssechskant
J4
Distanz
TECAN AG
REV
BY
DATE
A
PM
10.09.96
B
PM
1.11.96
TITLE: ASSEMBLY SOLDER SIDE
FOR : OPTIBO V2.0-C
PROJEKT: GENESIS
RA3-JOB: OPTIBO V2.0-C
CREATED: STEFAN MUELLER
DATE: 30.11.95
CHECKED: PETER MUERSET
DATE: 30.11.95
DOC.NR: 02008908
SHEET 1 OF 1

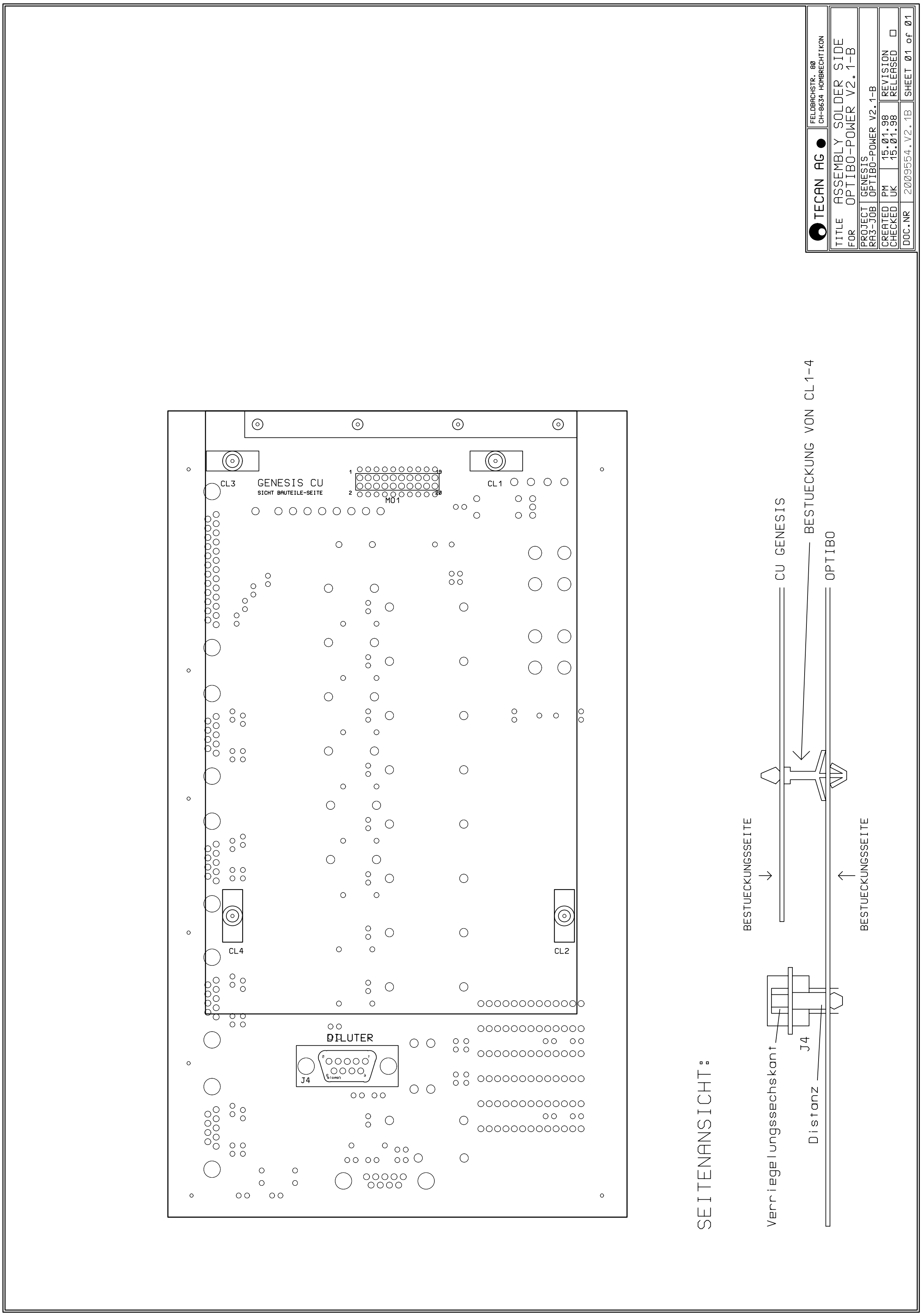
2009554 V2.1B Schematics


TITLE: SCHEMATICS
FOR : OPTIBO-POWER V2.1-B
PROJECT: GENESIS
RA3-JOB: OPTIBO-POWER V2.1-B
CREATED: PETER MUERSET DATE: 15.01.98
CHECKED: URS KNECHT DATE: 15.01.98
DOC.NR:2009554.V2.1-B
SHEET 1 OF 1
TECAN AG
REV
BY
DATE
TOTAL POWER:
MAX. 1000W
24V/42A
POWER IN 1
POWER IN 2
BR01
BR02
+24V
GND
C1 680uF/35V/HF
C2 680uF/35V/HF
VPP1
VPP2
PGND
PFAIL
OPTION 1
OPTION 2
OPTION 3
OPTION 4
female
CAN0_H
CAN0_L
SYSTEM_CAN
BUS-END
OPTION CAN
CAN_H
CAN_L
RS232
HOST
male
TXD
RXD
RTS
CTS
D13 1N4005
VPPCU
ERDUNG
EARTH
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
M01
CU GENESIS
OPTION 5
CANDI/UNIPORT
DIL CHAIN
LIQUIDHANDLING
ARM
ROBOTIC
ARM
P6KE33
GREEN
FU1 6,3A T
FU2 8A T
FU3 8A T
FU4 8A T
FU5 8A T
FU6 8A T
FU7 8A T
FU8 8A T
FU9 8A T

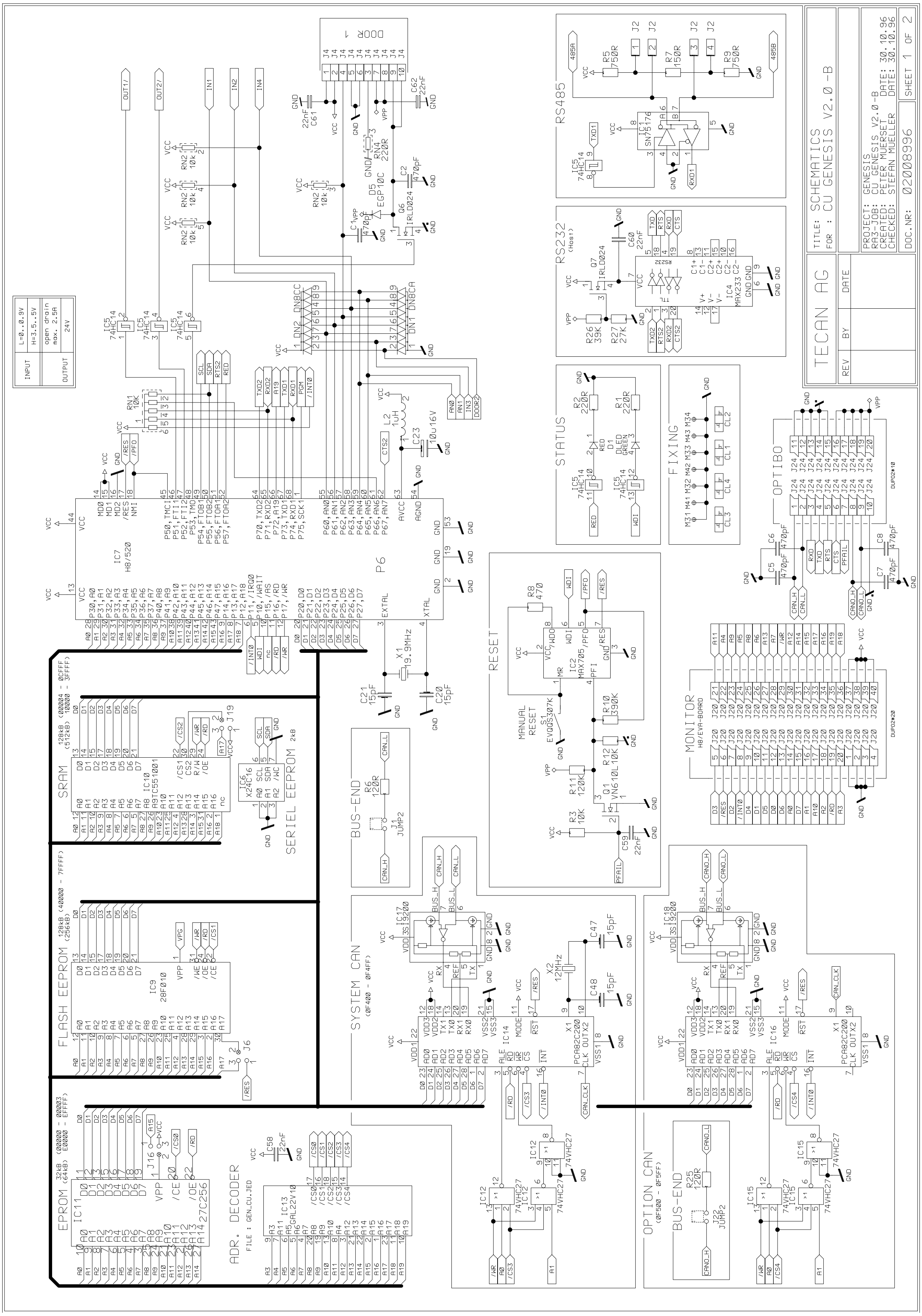
2009554 V2.1B Assembly component side


TECAN AG ● FELDBACHSTR. 80 CH-8634 HOMBRECHTIKON
TITLE ASSEMBLY COMPONENT SIDE
FOR OPTIBO-POWER V2.1-B
PROJECT GENESIS
RA3-JOB OPTIBO-POWER V2.1-B
CREATED PM 15.01.98
CHECKED UK 15.01.98
REVISION
RELEASED ☐
DOC.NR 2009554.V2.1B
SHEET 01 of 01
VPP2 +24V
VPP1 +24V
GND
POWER FAIL
CL1
CL3
MO1
POWER FAIL
J11
L2
L1
C43
CAN0_H
CTS
TXD
CAN_L
CAN_H
RXD
RTS
CAN0_L
GND
J1
13
25
HOST RS232
1
14
C1
D13
+24V
GND
J2 POWER IN 1
C4
C5
+24V
GND
J14 POWER IN 2
D1
FU1 T6.3A CU
R1
D11
FU6 T8A OPTION 1
R6
D14
FU7 T8A OPTION 2
R7
D16
FU8 T8A OPTION 3
R8
D18
FU9 T8A OPTION 4
R9
D7
FU4 T8A DILUTER
R4
FU2 T8A ROMA
R2
FU3 T8A LIHA
R3
FU5 T8A OPTION 5 or CANDI & UNIPORT
R5
C42
C2
C3
WARNING !!!
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH FUSES OF THE SPECIFIED TYPE AND CURRENT RATINGS !
OPTIBO
V2.1
CL2
CL4
J7
J8
J9
J10
CAN OPTION 1
CAN OPTION 2
CAN OPTION 3
CAN OPTION 4
FEMALE
J15 GND
J6
ROMA
C39
C38
J16 GND
J17 GND
J5
LIHA
C35
C34
J18 GND
C40
C41
C36
C37
D5
D3
J4
DILUTER
C29
C28
C27
C26
C32
C33
C31
C30
D9
OPTION 5 or CANDI & UNIPORT
J3
R11
R12
J12
J13
BUS-END
SYSTEM-CAN
OPTION-CAN

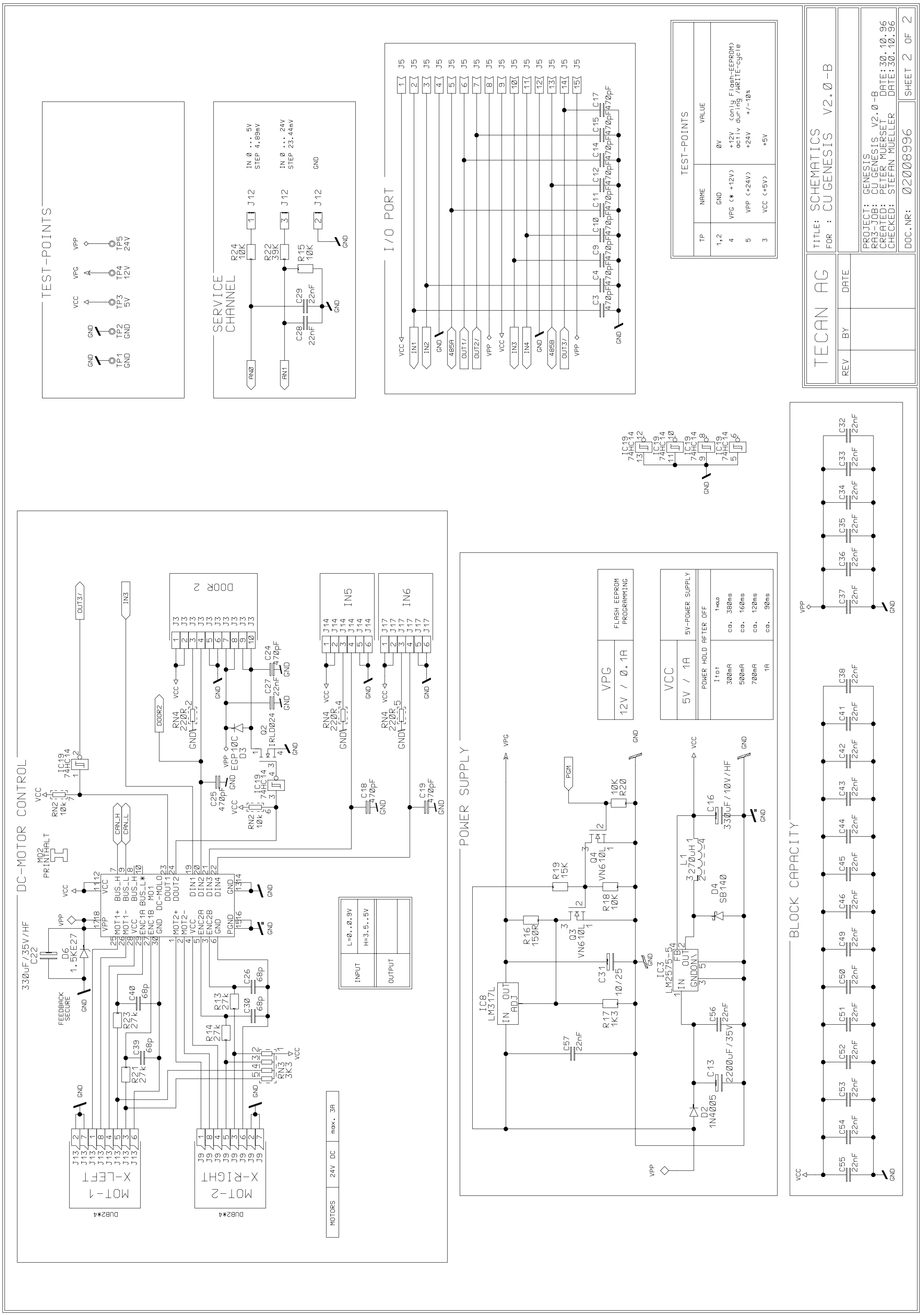
2009554 V2.1B Assembly solder side


TECAN AG ●
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON
TITLE ASSEMBLY SOLDER SIDE
FOR OPTIBO-POWER V2.1-B
PROJECT GENESIS
RA3-JOB OPTIBO-POWER V2.1-B
CREATED PM 15.01.98
CHECKED UK 15.01.98
REVISION
RELEASED ☐
DOC.NR 2009554.V2.1B
SHEET 01 of 01
CL3
GENESIS CU
SICHT BAUTEILE-SEITE
1
2
M01
CL1
CL4
CL2
DILUTER
J4
SEITENANSICHT:
BESTUECKUNGSSEITE
CU GENESIS
BESTUECKUNG VON CL1-4
OPTIBO
BESTUECKUNGSSEITE
Verriegelungssechskant
J4
Distanz

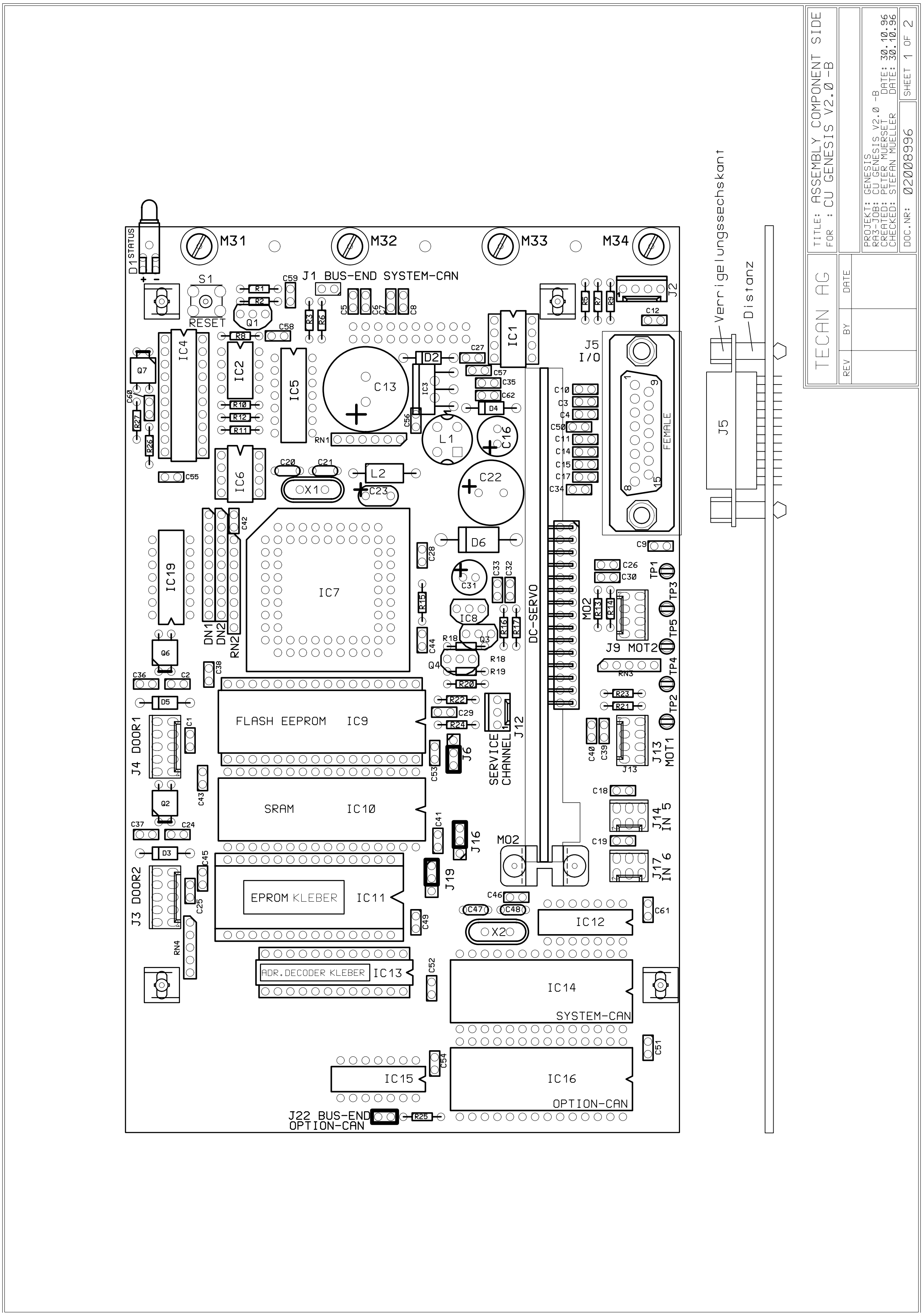
2008996 V2.0B p.1 Schematics


TITLE: SCHEMATICS CU GENESIS V2.0 -B
FOR : CU GENESIS V2.0 -B
TECAN AG
REV
BY
DATE
PROJECT: GENESIS
RA3-JOB: CU GENESIS V2.0 -B
CREATED: PETER MUERSET DATE: 30.10.96
CHECKED: STEFAN MUELLER DATE: 30.10.96
DOC.NR: 02008996
SHEET 1 OF 2
RS485
RS232
STATUS
FIXING
OPTIBO
MONITOR
RESET
BUS-END
SYSTEM CAN
OPTION CAN
SRAM
FLASH EEPROM
EPROM
ADR. DECODER
SERIEL EEPROM
DOOR 1
IC7 H8/520

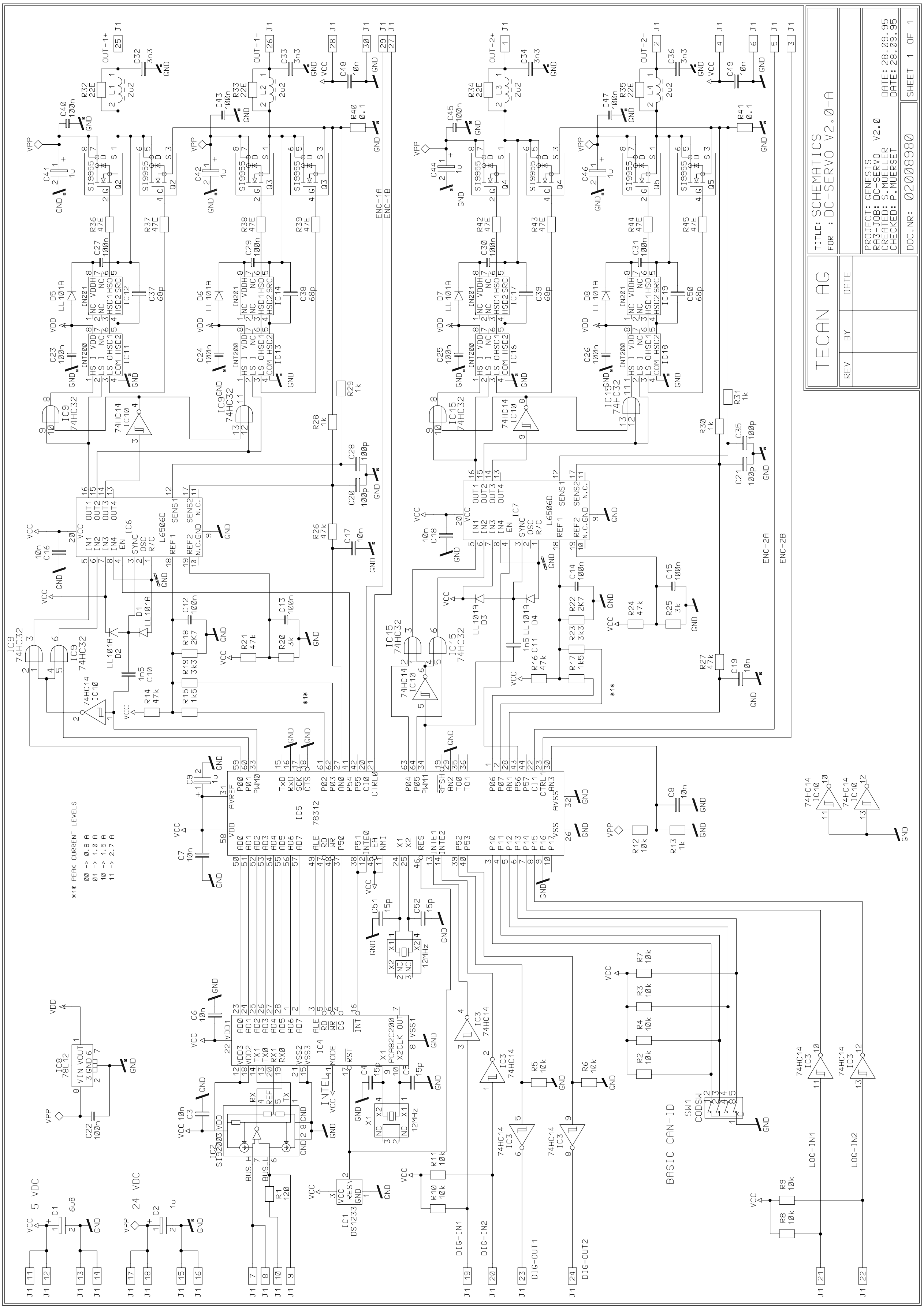
2008996 V2.0B p.2 Schematics


TEST-POINTS
TP1 GND
TP2 GND
TP3 5V
TP4 12V
TP5 24V
SERVICE CHANNEL
J12
IN 0 ... 5V STEP 4.89mV
IN 0 ... 24V STEP 23.44mV
I/O PORT
J5
TEST-POINTS
TP
NAME
VALUE
1,2 GND 0V
4 VPG (* +12V) +12V (only Flash-EEPROM) activ during /WRITE-cycle
5 VPP (+24V) +24V +/-10%
3 VCC (+5V) +5V
TITLE: SCHEMATICS
FOR : CU GENESIS V2.0-B
TECAN AG
REV
BY
DATE
PROJECT: GENESIS
RR3-JOB: CU GENESIS V2.0-B
CREATED: PETER MUESET DATE:30.10.96
CHECKED: STEFAN MUELLER DATE:30.10.96
SHEET 2 OF 2
DOC.NR: 02008996
DC-MOTOR CONTROL
DOOR 2
IN5
IN6
MOT-1 X-LEFT
MOT-2 X-RIGHT
MOTORS 24V DC max. 3A
INPUT L=0..0.9V
OUTPUT H=3.5..5V
POWER SUPPLY
VPG 12V / 0.1A
FLASH EEPROM PROGRAMMING
VCC 5V / 1A
5V-POWER SUPPLY
POWER HOLD AFTER OFF
Itot 300mA 500mA 700mA 1A
THOLD ca. 300ms ca. 160ms ca. 120ms ca. 90ms
IC8 LM317L
IC3 LM2575-5
L1 270uH
D4 SB140
C13 2200uF/35V
C16 330uF/10V/HF
D2 1N4005
BLOCK CAPACITY

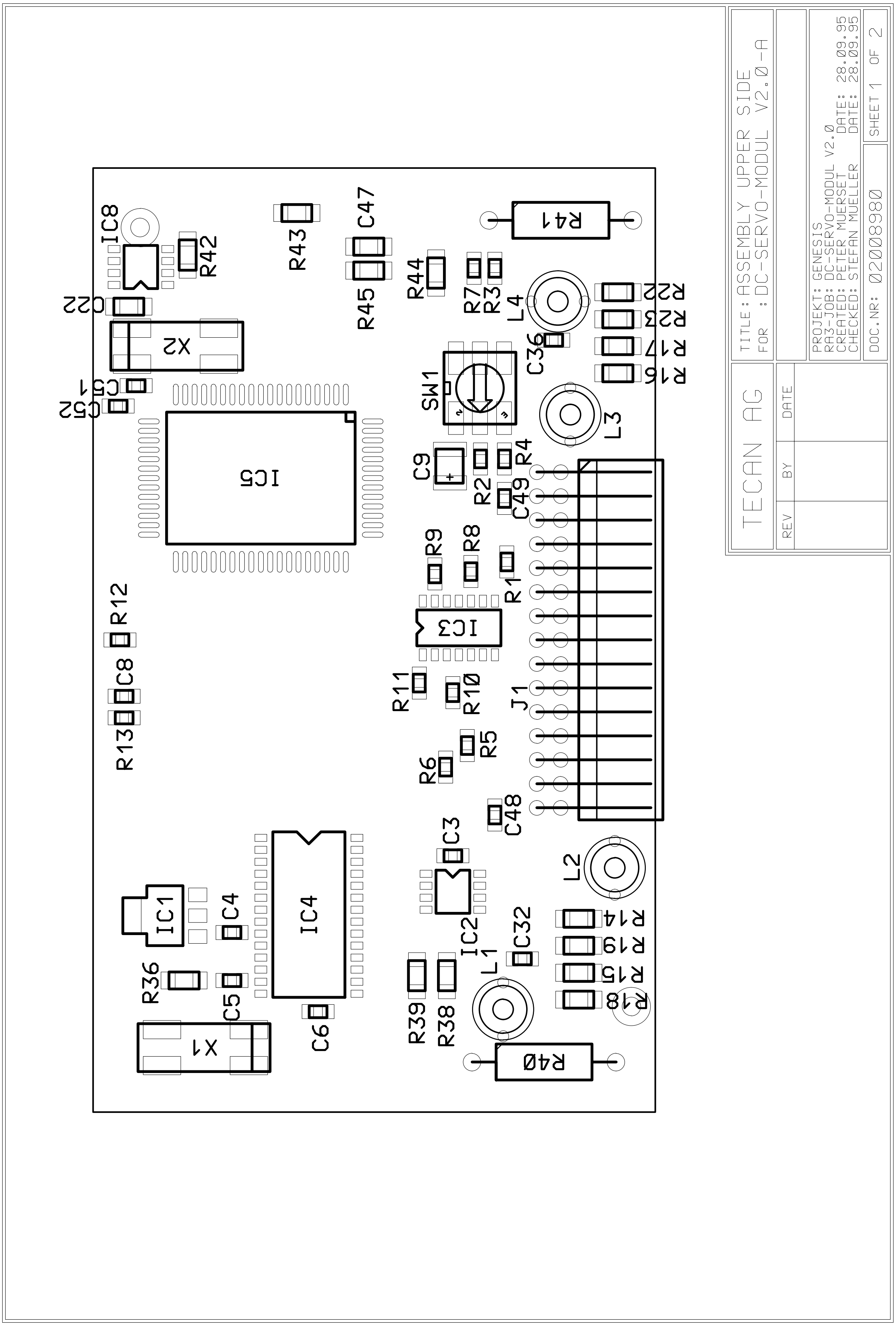
2008996 V2.0B p.1 Assembly component side


M31
M32
M33
M34
D1 STATUS
S1
RESET
Q1
J1 BUS-END SYSTEM-CAN
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
FLASH EEPROM IC9
SRAM IC10
EPROM KLEBER IC11
IC12
ADR.DECODER KLEBER IC13
IC14
SYSTEM-CAN
IC15
IC16
OPTION-CAN
IC19
C13
C16
C22
C23
L1
L2
X10
X20
D2
D3
D4
D5
D6
Q2
Q3
Q4
Q6
Q7
RN1
RN2
RN3
RN4
DN1
DN2
J2
J5
I/O
FEMALE
J3 DOOR2
J4 DOOR1
J6
J9 MOT2
J12
SERVICE CHANNEL
J13 MOT1
J14 IN 5
J16
J17 IN 6
J19
J22 BUS-END
OPTION-CAN
DC-SERVO
MO2
TP1
TP2
TP3
TP4
TP5
Verriegelungssechskant
Distanz
TITLE: ASSEMBLY COMPONENT SIDE
FOR : CU GENESIS V2.0 -B
PROJEKT: GENESIS
RA3-JOB: CU GENESIS V2.0 -B
CREATED: PETER MUERSET DATE: 30.10.96
CHECKED: STEFAN MUELLER DATE: 30.10.96
SHEET 1 OF 2
DOC.NR: 02008996
TECAN AG
REV
BY
DATE

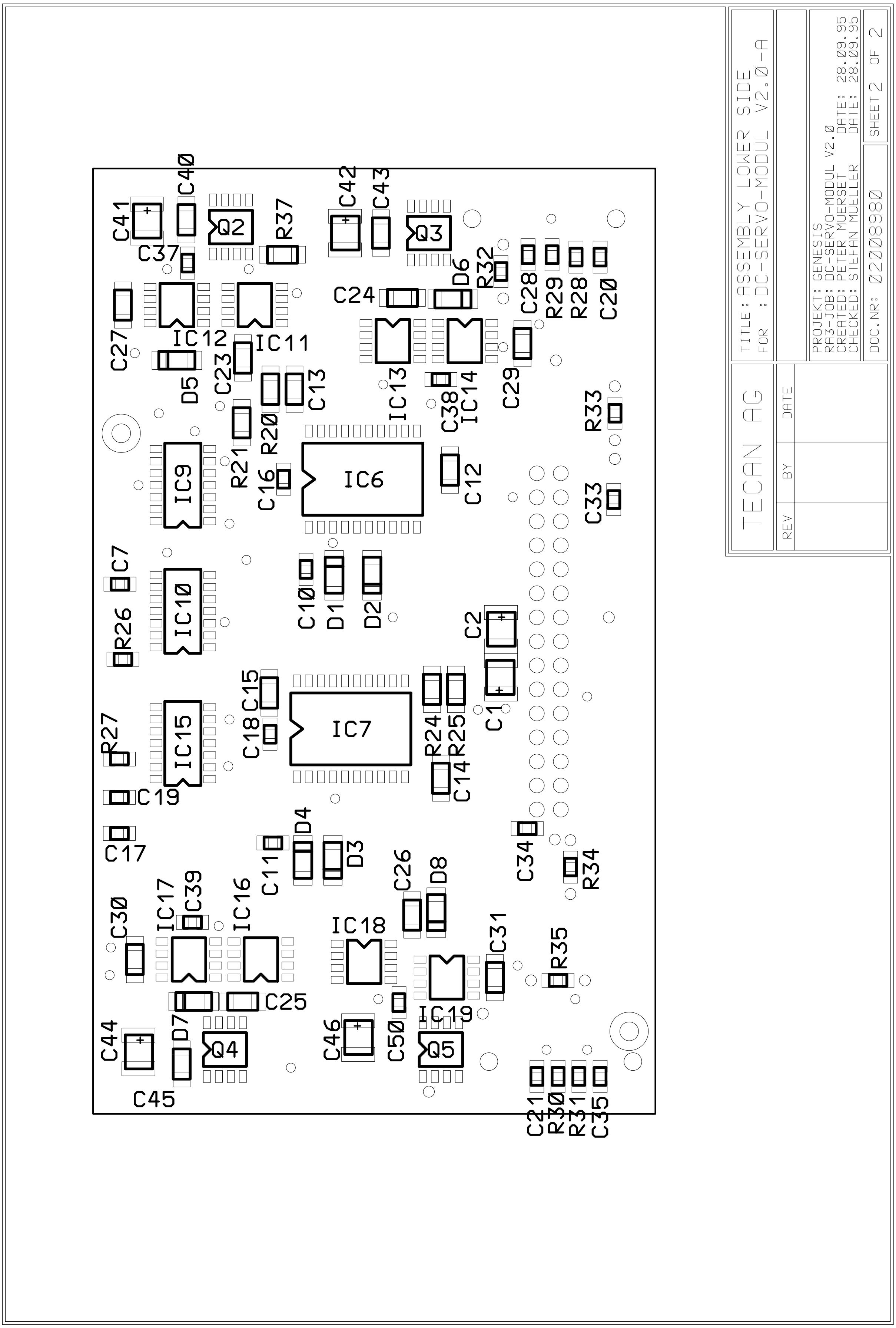
2008980 V.2.0A Schematics


TECAN AG
REV
BY
DATE
TITLE: SCHEMATICS
FOR : DC-SERVO V2.0-A
PROJECT: GENESIS
RA3-JOB: DC-SERVO V2.0
CREATED: S.MUELLER DATE: 28.09.95
CHECKED: P.MUERSET DATE: 28.09.95
DOC.NR: 02008980
SHEET 1 OF 1
1 PEAK CURRENT LEVELS
00 -> 0.8 A
01 -> 1.0 A
10 -> 1.5 A
11 -> 2.7 A
1
IC5 78312
IC4 PCA82C200
IC6 L6506D
IC7 L6506D
IC2 SI9200
IC1 DS1233
IC8 78L12
X1 12MHz
BASIC CAN-ID
SW1 CODSW
OUT-1+
OUT-1-
OUT-2+
OUT-2-
ENC-1A
ENC-1B
ENC-2A
ENC-2B
DIG-IN1
DIG-IN2
DIG-OUT1
DIG-OUT2
LOG-IN1
LOG-IN2
BUS_H
BUS_L
5 VDC
24 VDC
VCC
VPP
VDD
GND
J1

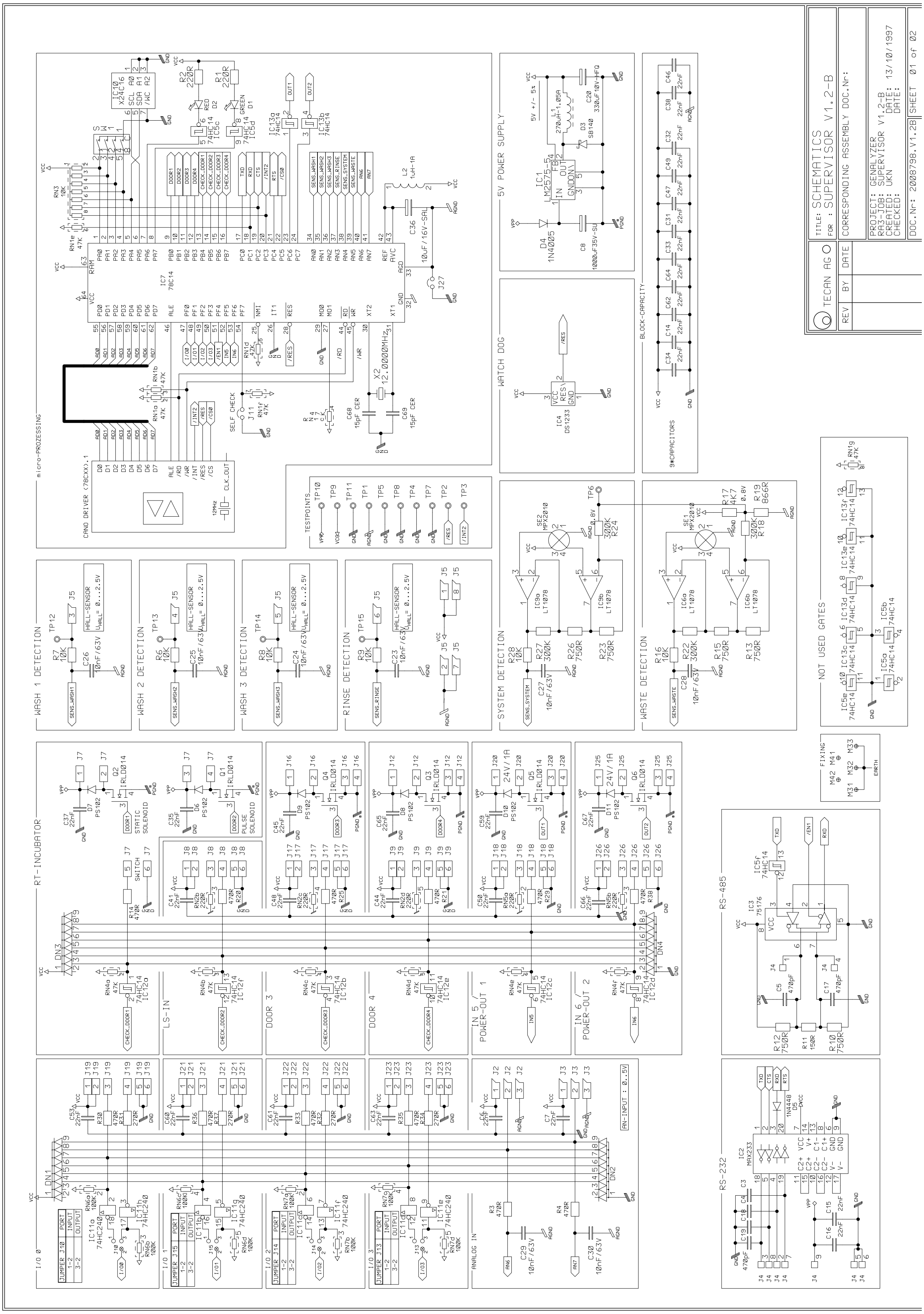
2008980 V.2.0A Assembly upper side


TITLE: ASSEMBLY UPPER SIDE
FOR : DC-SERVO-MODUL V2.0-A
PROJEKT: GENESIS
RA3-JOB: DC-SERVO-MODUL V2.0
CREATED: PETER MUERSET DATE: 28.09.95
CHECKED: STEFAN MUELLER DATE: 28.09.95
DOC.NR: 02008980
SHEET 1 OF 2
TECAN AG
REV
BY
DATE
IC8
R42
R43
C47
R45
R41
R44
R7
R3
L4
R22
R23
R17
R16
C22
X2
C36
C51
C52
SW1
L3
IC5
C9
R2
R4
C49
R9
R8
R1
IC3
R12
C8
R13
R11
R10
J1
R5
R6
C48
C3
L2
IC1
C4
IC4
IC2
C32
R14
R19
R15
R18
L1
R36
R39
R38
C5
C6
X1
R40

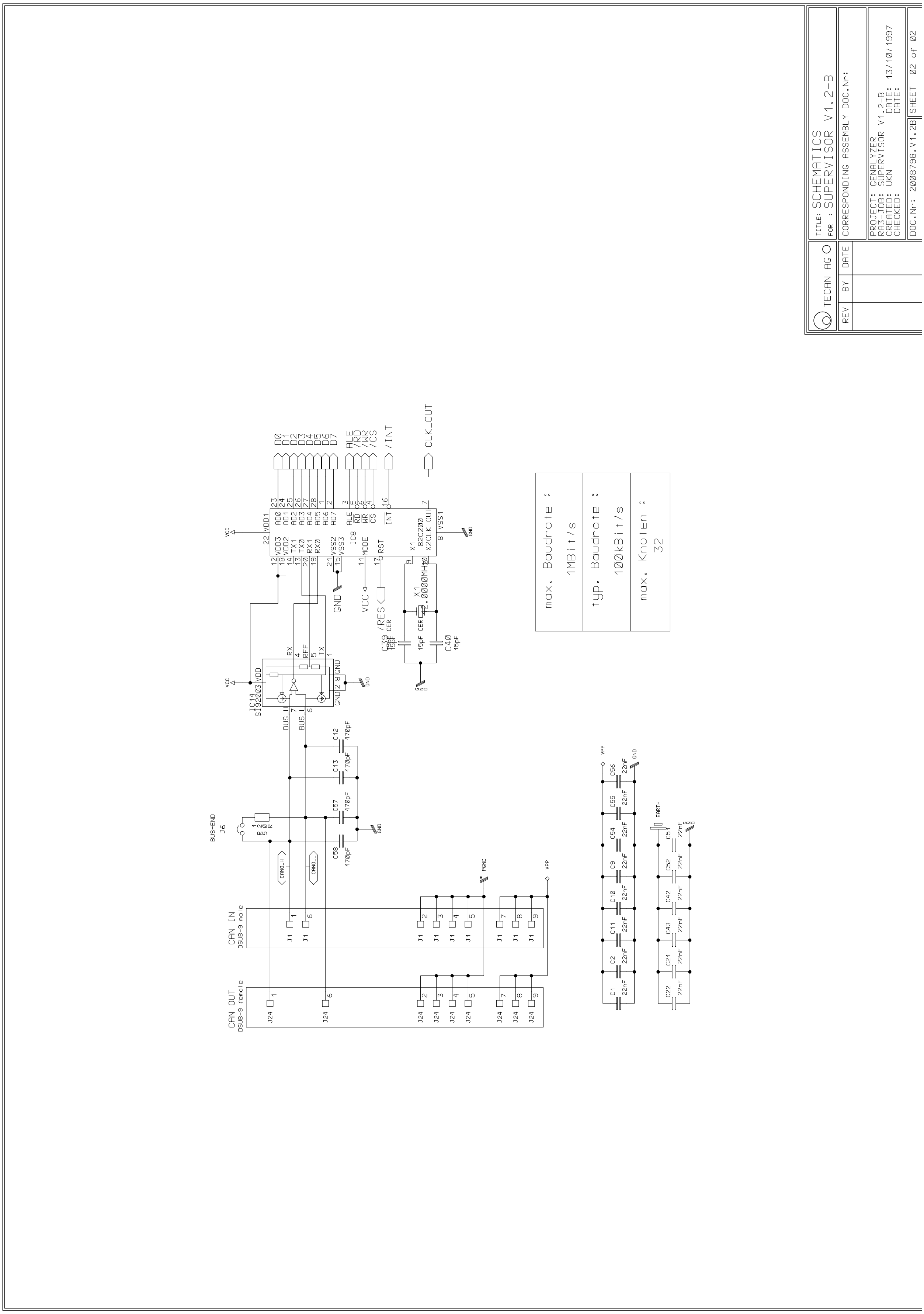
2008980 V.2.0A Assembly lower side


TITLE: ASSEMBLY LOWER SIDE
FOR : DC-SERVO-MODUL V2.0 -A
PROJEKT: GENESIS
RA3-JOB: DC-SERVO-MODUL V2.0
CREATED: PETER MUERSET DATE: 28.09.95
CHECKED: STEFAN MUELLER DATE: 28.09.95
DOC.NR: 02008980
SHEET 2 OF 2
TECAN AG
REV
BY
DATE
C41
C40
Q2
R37
C42
C43
Q3
C37
D6
R32
C28
R29
R28
C20
C24
C27
IC12
IC11
IC13
IC14
C29
D5
C23
C13
C38
R33
R21
R20
C16
IC9
IC6
C12
C33
C7
IC10
C10
D1
D2
C2
R26
C15
C18
IC7
R24
R25
C1
R27
IC15
C14
C19
D4
C17
C11
D3
C26
D8
C34
R34
C30
IC17
C39
IC16
IC18
C31
R35
C25
C44
D7
Q4
C46
C50
IC19
Q5
C45
C21
R30
R31
C35

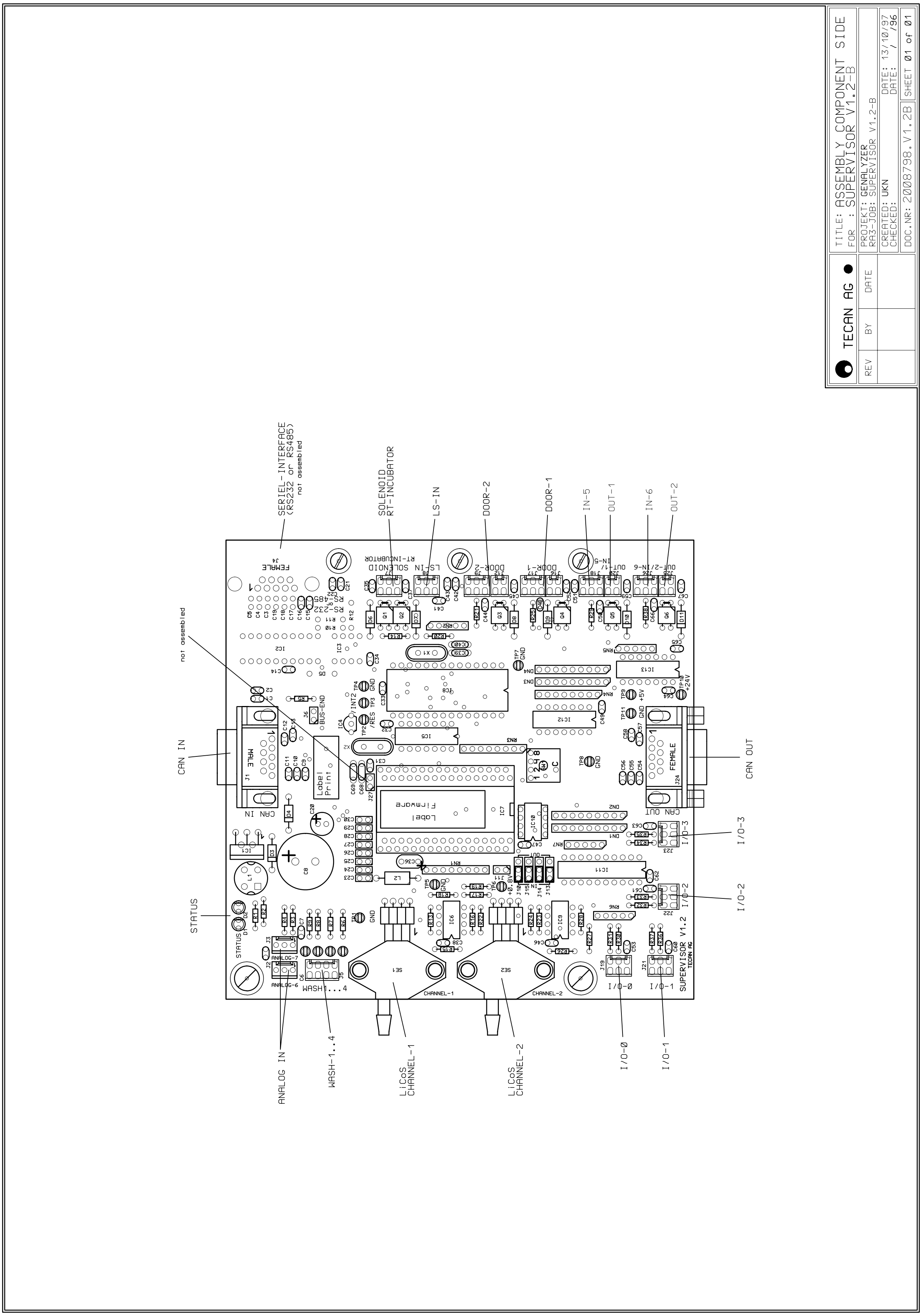
2008798 V1.2B p.1 Schematics


TITLE: SCHEMATICS
FOR : SUPERVISOR V1.2-B
CORRESPONDING ASSEMBLY DOC.Nr:
PROJECT: GENALYZER
RA3-JOB: SUPERVISOR V1.2-B
CREATED: UKN DATE: 13/10/1997
CHECKED: DATE:
DOC.Nr: 2008798.V1.2B
SHEET 01 of 02
TECAN AG
REV
BY
DATE
micro-PROZESSING
CAN0 DRIVER (78CXX).1
IC7 78C14
IC10 X24C16
X2 12.0000MHz
5V POWER SUPPLY
IC1 LM2575-5
L1 270uH-1.05A
D3 SB140
C20 330uF10V-HFQ
D4 1N4005
C8 1000uF35V-SU
WATCH DOG
IC4 DS1233
BLOCK-CAPACITY
9*CAPACITORS
TESTPOINTS
WASH 1 DETECTION
WASH 2 DETECTION
WASH 3 DETECTION
RINSE DETECTION
HALL-SENSOR
SYSTEM DETECTION
WASTE DETECTION
SE2 MPX2010
SE1 MPX2010
NOT USED GATES
RT-INCUBATOR
STATIC SOLENOID
PULSE SOLENOID
SWITCH
LS-IN
DOOR 3
DOOR 4
IN 5 / POWER-OUT 1
IN 6 / POWER-OUT 2
FIXING
EARTH
RS-485
IC3 75176
RS-232
IC2 MAX233
I/O 0
I/O 1
I/O 2
I/O 3
JUMPER J10 PORT INPUT OUTPUT
ANALOG IN
AN-INPUT : 0..5V
DN1
DN2
DN3
DN4

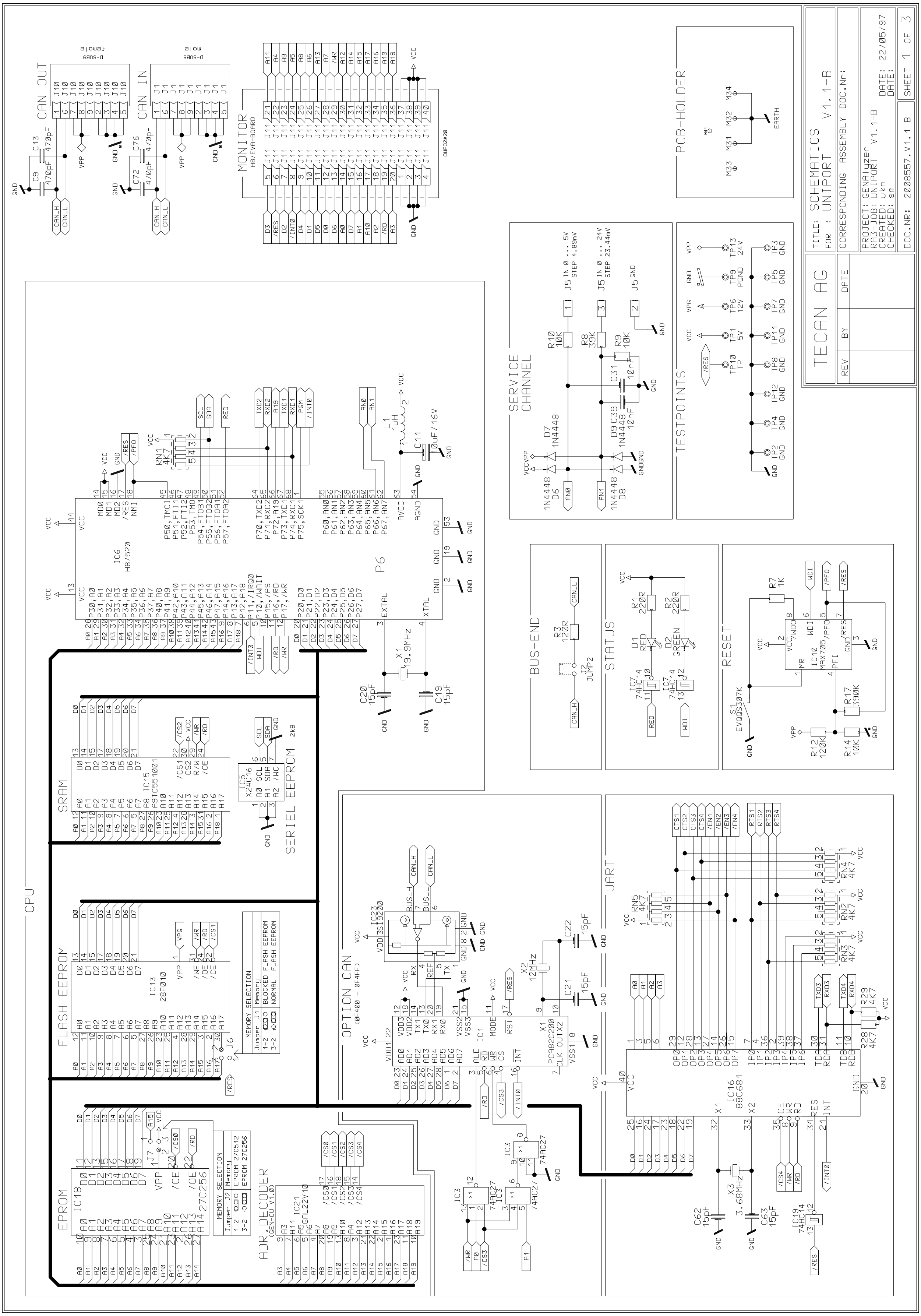
2008798 V1.2B p.2 Schematics


TITLE: SCHEMATICS
FOR : SUPERVISOR V1.2-B
CORRESPONDING ASSEMBLY DOC.Nr:
PROJECT: GENALYZER
RA3-JOB: SUPERVISOR V1.2-B
CREATED: UKN DATE: 13/10/1997
CHECKED: DATE:
DOC.Nr: 2008798.V1.2B
SHEET 02 of 02
TECAN AG
REV
BY
DATE
D0
D1
D2
D3
D4
D5
D6
D7
ALE
/RD
/WR
/CS
/INT
CLK_OUT
IC8
82C200
VCC
GND
/RES
X1
12.0000MHz
C39
C40
15pF
IC14
SI9200
BUS_H
BUS_L
RX
REF
TX
C12
C13
C57
C58
470pF
BUS-END
J6
R2
CAN0_H
CAN0_L
CAN IN
DSUB-9 male
CAN OUT
DSUB-9 female
J1
J24
PGND
VPP
EARTH
22nF
max. Baudrate :
1MBit/s
typ. Baudrate :
100kBit/s
max. Knoten :
32

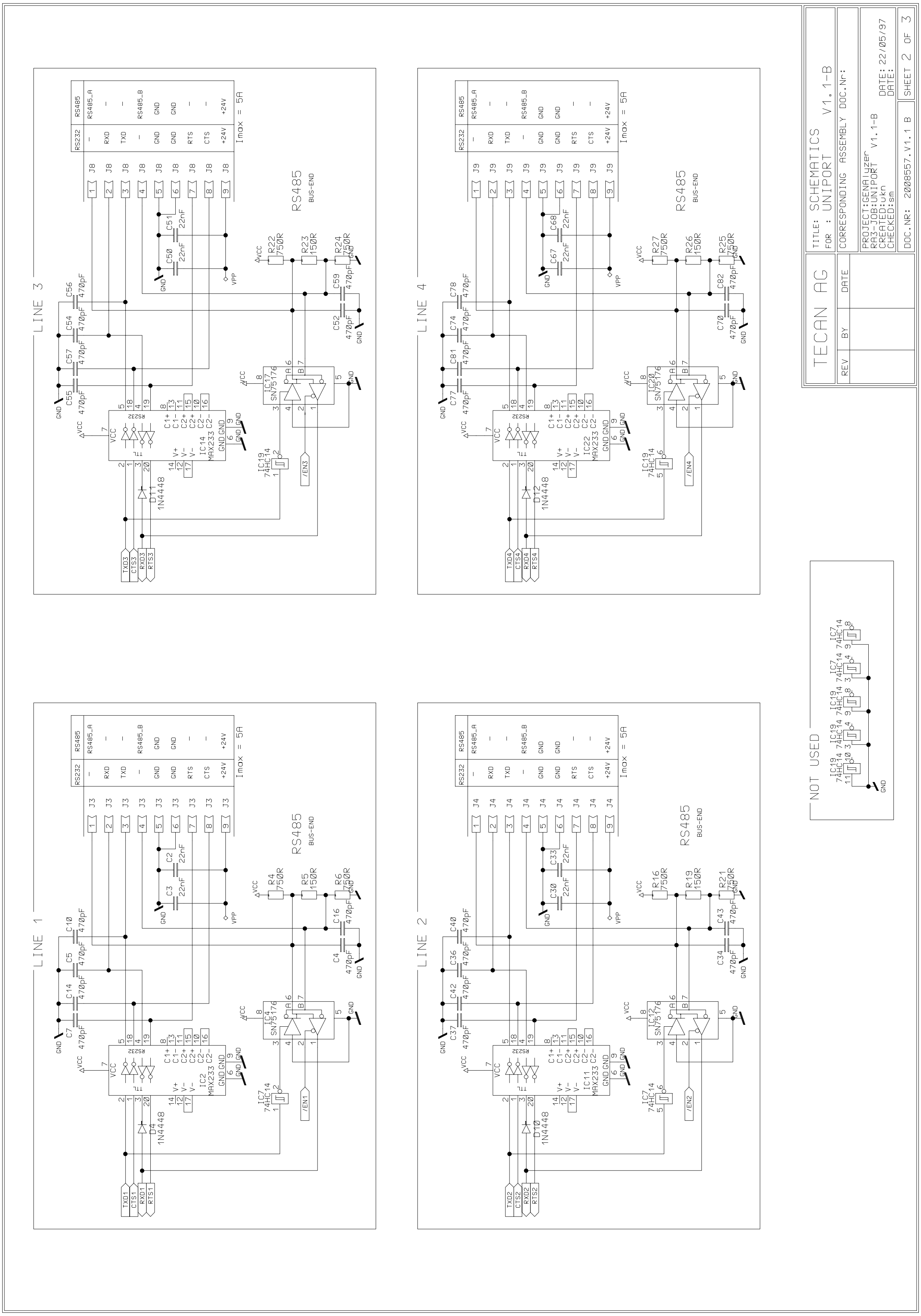
2008798 V1.2B Assembly component side


TITLE: ASSEMBLY COMPONENT SIDE
FOR : SUPERVISOR V1.2-B
PROJEKT: GENALYZER
RA3-JOB: SUPERVISOR V1.2-B
CREATED: UKN DATE: 13/10/97
CHECKED: DATE: / /96
DOC.NR: 2008798.V1.2B
SHEET 01 of 01
TECAN AG
REV
BY
DATE
SERIEL-INTERFACE (RS232 or RS485) not assembled
SOLENOID RT-INCUBATOR
LS-IN
DOOR-2
DOOR-1
IN-5
OUT-1
IN-6
OUT-2
not assembled
CAN IN
STATUS
CAN OUT
I/O-3
I/O-2
ANALOG IN
WASH-1..4
LiCoS CHANNEL-1
LiCoS CHANNEL-2
I/O-0
I/O-1
SUPERVISOR V1.2
Firmware
Label
Label Print

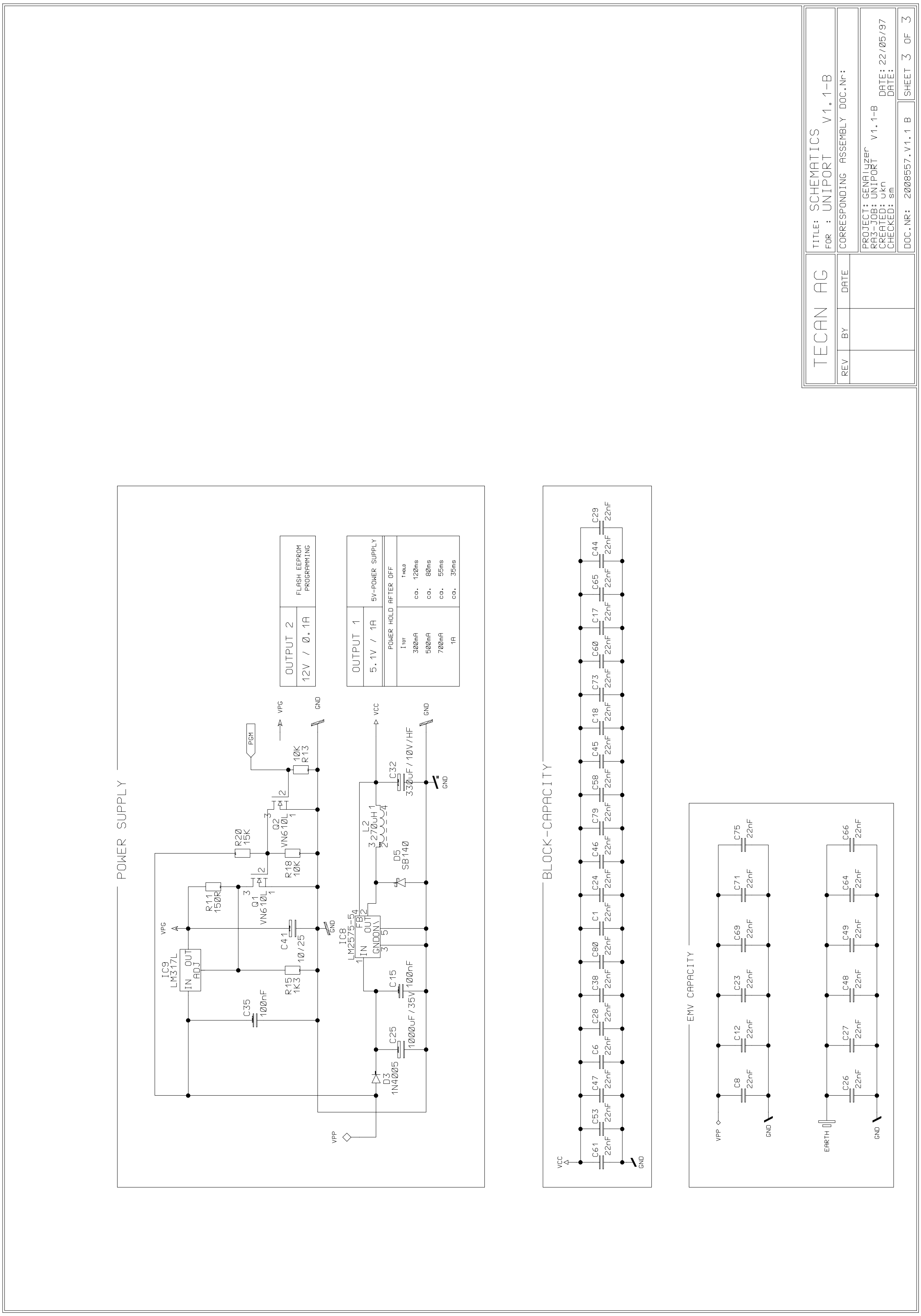
2008557 V1.1B p.1 Schematics


CAN OUT
CAN IN
MONITOR
PCB-HOLDER
SERVICE CHANNEL
TESTPOINTS
CPU
BUS-END
STATUS
RESET
SRAM
SERIEL EEPROM
FLASH EEPROM
OPTION CAN
UART
EPROM
ADR. DECODER
TITLE: SCHEMATICS
FOR : UNIPORT V1.1-B
CORRESPONDING ASSEMBLY DOC.Nr:
TECAN AG
REV
BY
DATE
PROJECT: GENalyzer
RA3-JOB: UNIPORT V1.1-B
CREATED: vkn
CHECKED: sm
DATE: 22/05/97
DATE:
DOC.NR: 2008557.V1.1 B
SHEET 1 OF 3

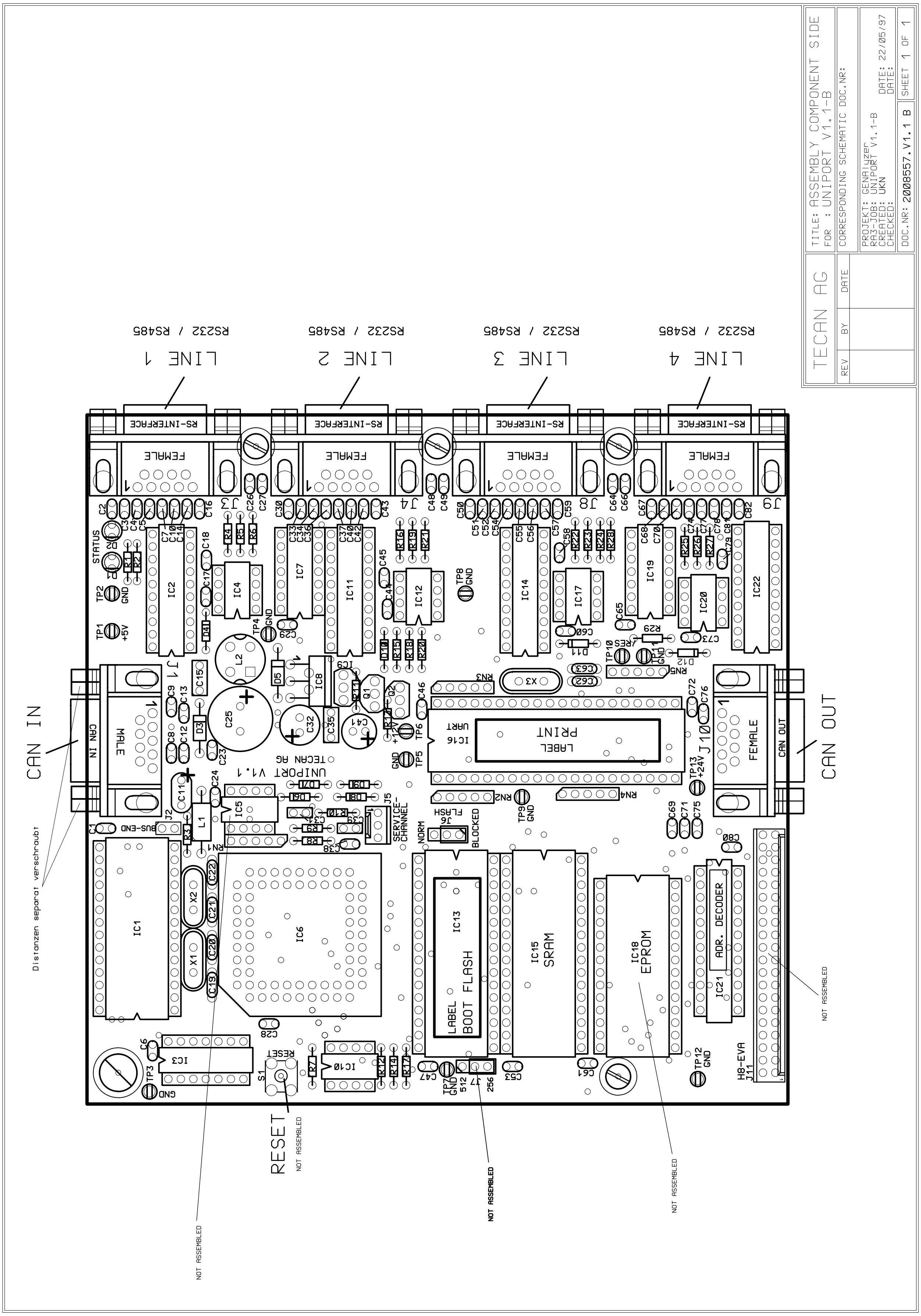
2008557 V1.1B p.2 Schematics


LINE 1
LINE 2
LINE 3
LINE 4
RS485 BUS-END
RS232
RS485
Imax = 5A
MAX233
SN75176
74HC14
1N4448
NOT USED
TECAN AG
REV
BY
DATE
TITLE: SCHEMATICS V1.1-B
FOR : UNIPORT
CORRESPONDING ASSEMBLY DOC.Nr:
PROJECT:GENALyzer
RA3-JOB:UNIPORT V1.1-B
CREATED:ukn
CHECKED:sm
DATE: 22/05/97
DATE:
DOC.NR: 2008557.V1.1 B
SHEET 2 OF 3

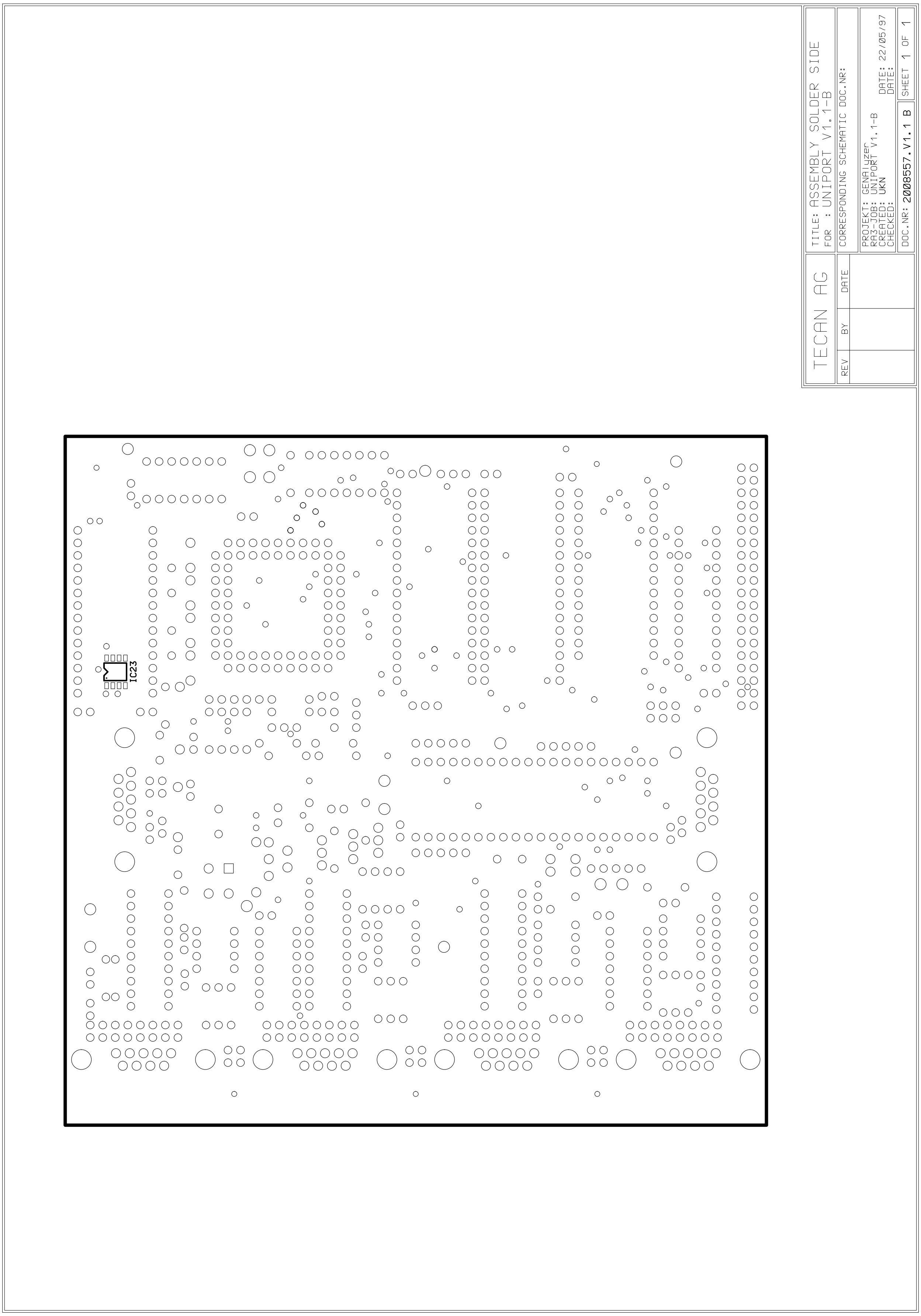
2008557 V1.1B p.3 Schematics


TITLE: SCHEMATICS
FOR : UNIPORT V1.1-B
CORRESPONDING ASSEMBLY DOC.Nr:
PROJECT: GENAlyzer
RA3-JOB: UNIPORT V1.1-B
CREATED: ukn DATE: 22/05/97
CHECKED: sm DATE:
SHEET 3 OF 3
DOC.NR: 2008557.V1.1 B
TECAN AG
REV BY DATE
POWER SUPPLY
BLOCK-CAPACITY
EMV CAPACITY
FLASH EEPROM PROGRAMMING
OUTPUT 2
12V / 0.1A
5V-POWER SUPPLY
OUTPUT 1
5.1V / 1A
POWER HOLD AFTER OFF
I TOT
T HOLD
300mA co. 120ms
500mA co. 80ms
700mA co. 55ms
1A co. 35ms
IC9 LM317L
IN OUT ADJ
IC8 LM2575-54
IN OUT FB GND ON\
Q1 VN610L
Q2 VN610L
R11 150R
R20 15K
R18 10K
R13 10K
R15 1K3
C35 100nF
C41 10/25
C15 100nF
C25 1000uF/35V
C32 330uF/10V/HF
L2 3270uH
D5 SB140
D3 1N4005
PGM
VPG
VPP
VCC
GND
EARTH
C29 C44 C65 C17 C60 C73 C18 C45 C58 C79 C46 C24 C1 C80 C38 C28 C6 C47 C53 C61 22nF
C75 C71 C69 C23 C12 C8 22nF
C66 C64 C49 C48 C27 C26 22nF

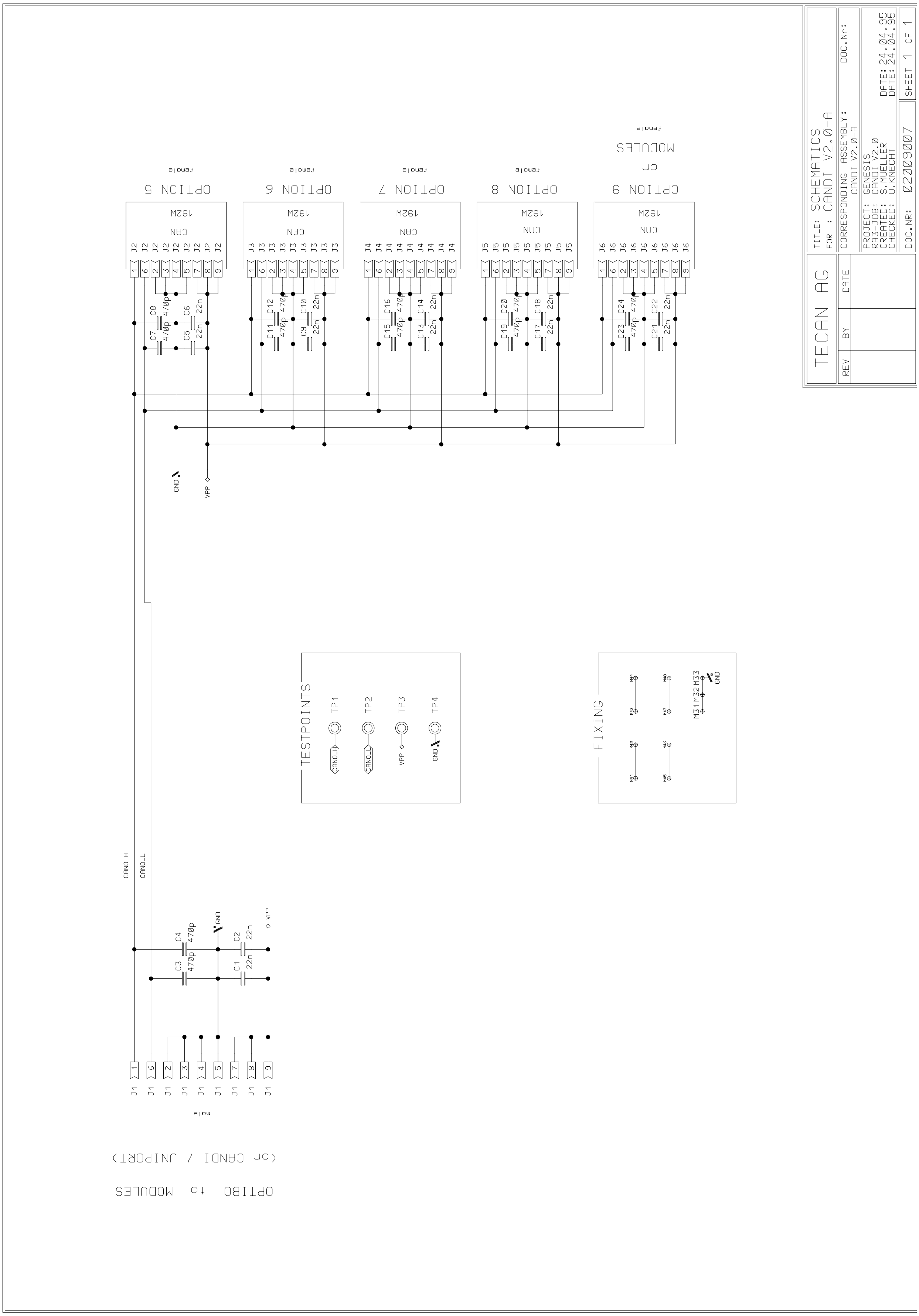
2008557 V1.1B Assembly component side


TITLE: ASSEMBLY COMPONENT SIDE
FOR : UNIPORT V1.1-B
CORRESPONDING SCHEMATIC DOC.NR:
PROJEKT: GENAlyzer
RA3-JOB: UNIPORT V1.1-B
CREATED: UKN
CHECKED:
DATE: 22/05/97
DATE:
SHEET 1 OF 1
DOC.NR: 2008557.V1.1 B
TECAN AG
REV
BY
DATE
RS232 / RS485
LINE 1
LINE 2
LINE 3
LINE 4
RS-INTERFACE
FEMALE
J3
J4
J8
J9
STATUS
TP1 +5V
TP2 GND
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC10
IC11
IC12
IC13
LABEL BOOT FLASH
IC14
IC15 SRAM
IC16 UART
PRINT LABEL
IC17
IC18 EPROM
IC19
IC20
IC21 ADR. DECODER
IC22
CAN IN
MALE
J1
J2
BUS-END
CAN OUT
FEMALE
J10
TP13 +24V
UNIPORT V1.1
TECAN AG
SERVICE-CHANNEL
J5
FLASH J6
NORM
BLOCKED
J7
512
256
RESET
S1
H8-EVA J11
X1
X2
X3
Distanzen separat verschraubt
NOT ASSEMBLED
NOT ASSEMBLED
NOT ASSEMBLED
NOT ASSEMBLED
NOT ASSEMBLED
RESET

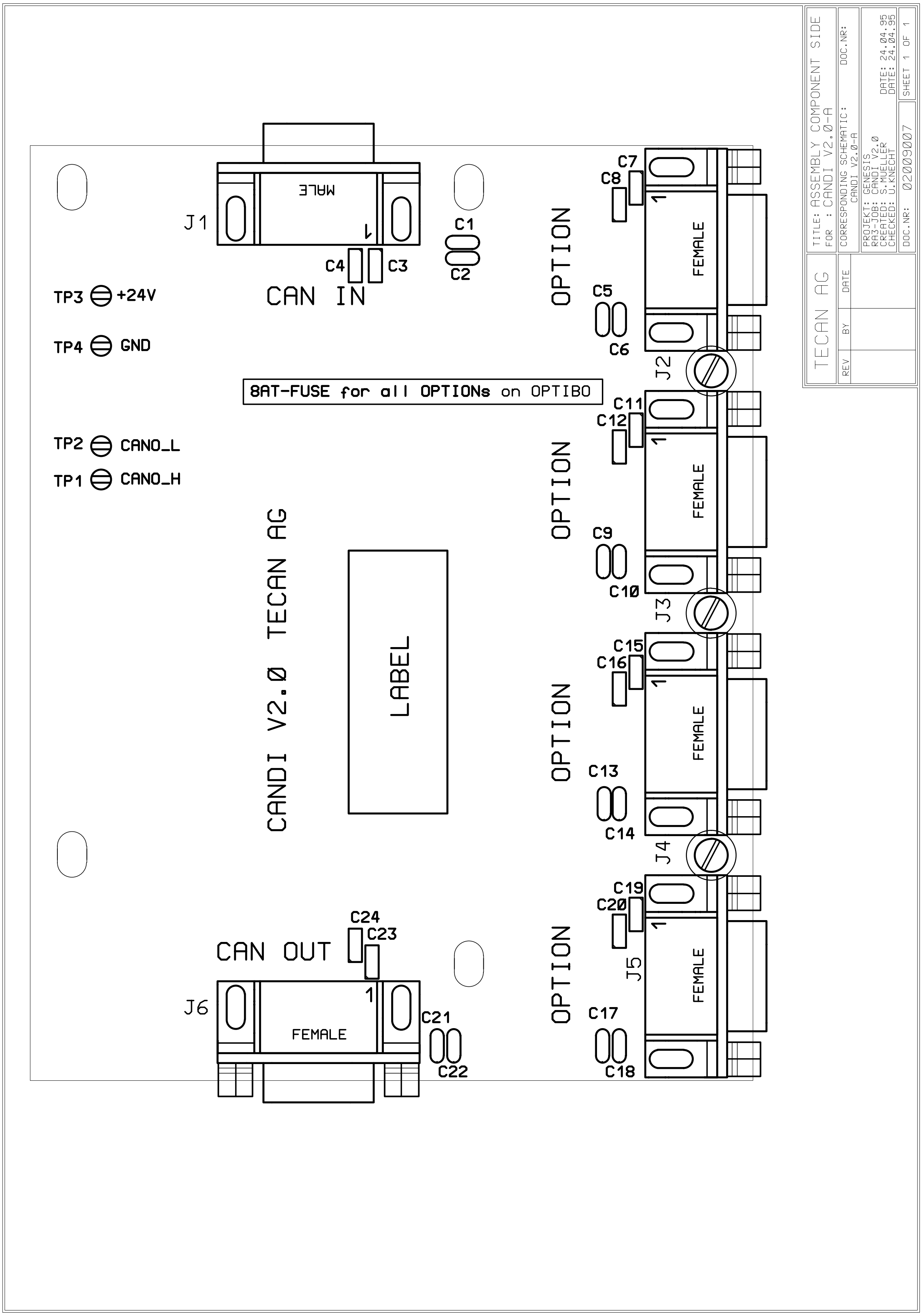
2008557 V1.1B Assembly solder side


IC23
TECAN AG
REV
BY
DATE
TITLE: ASSEMBLY SOLDER SIDE
FOR : UNIPORT V1.1-B
CORRESPONDING SCHEMATIC DOC.NR:
PROJEKT: GENAlyzer
RA3-JOB: UNIPORT V1.1-B
CREATED: UKN
CHECKED:
DATE: 22/05/97
DATE:
DOC.NR: 2008557.V1.1 B
SHEET 1 OF 1

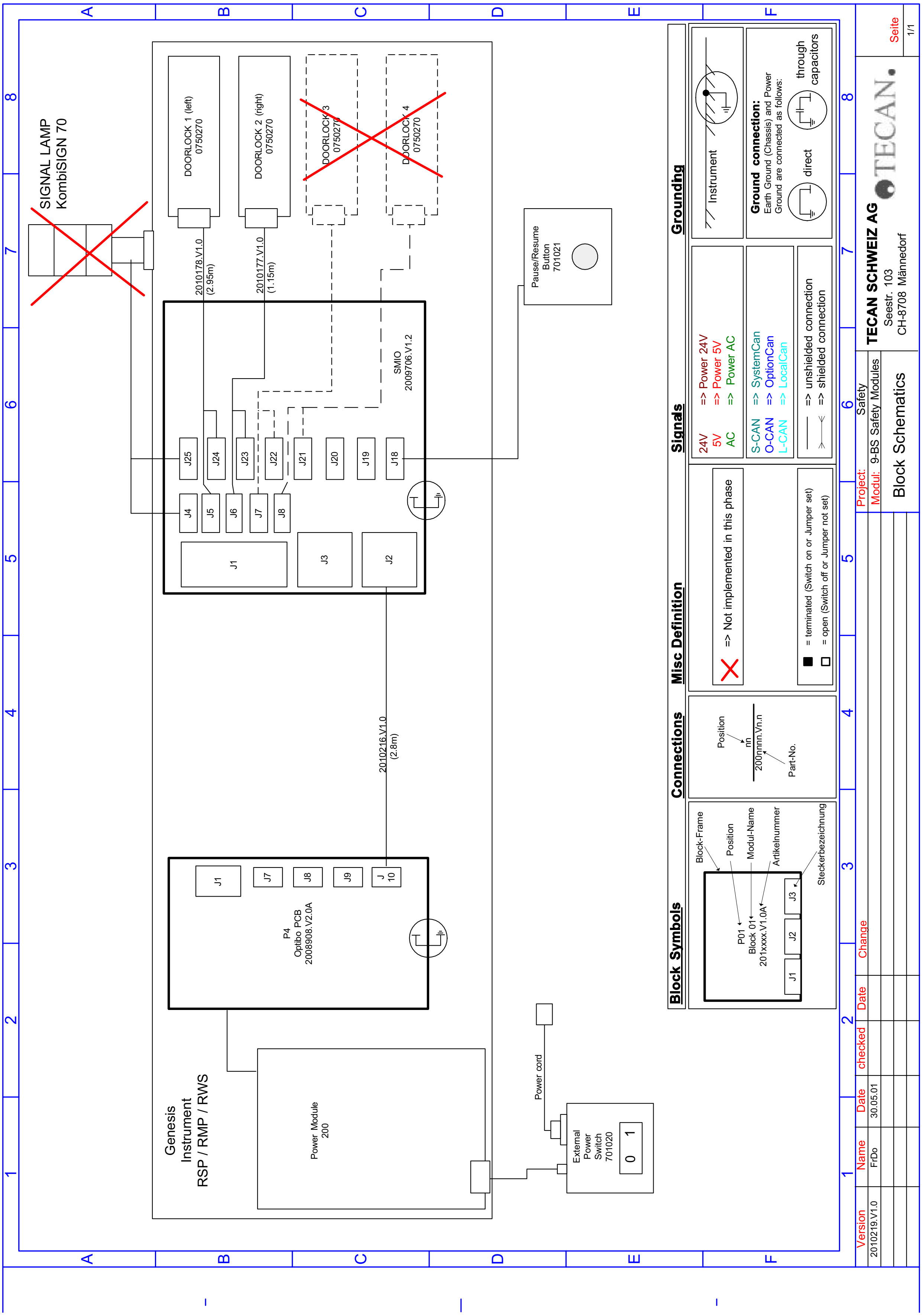
2009007 V.2.0A Schematics


OPTION 5
OPTION 6
OPTION 7
OPTION 8
OPTION 9
or
MODULES
female
CAN
192W
C1 22n
C2 22n
C3 470p
C4 470p
GND
VPP
CANO_H
CANO_L
male
OPTIBO to MODULES
(or CANDI / UNIPORT)
TESTPOINTS
TP1
TP2
TP3
TP4
FIXING
TITLE: SCHEMATICS
FOR : CANDI V2.0-A
DOC.Nr:
CORRESPONDING ASSEMBLY:
CANDI V2.0-A
PROJECT: GENESIS
RA3-JOB: CANDI V2.0
CREATED: S.MUELLER
CHECKED: U.KNECHT
DATE: 24.04.95
DATE: 24.04.95
SHEET 1 OF 1
DOC.NR: 02009007
TECAN AG
REV
BY
DATE

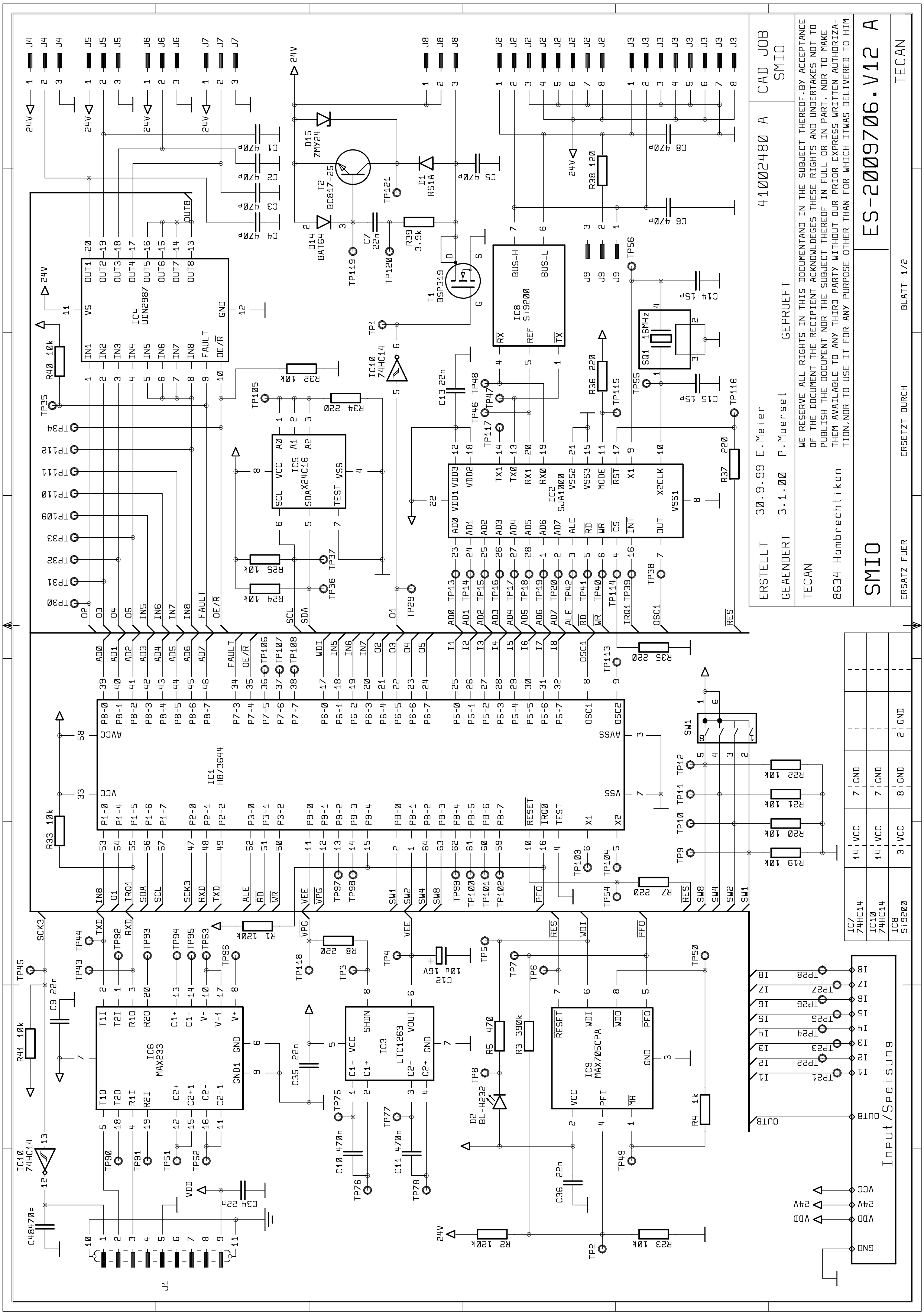
2009007 V.2.0A Assembly component side


J1
MALE
1
C4
C3
C1
C2
CAN IN
TP3 +24V
TP4 GND
8AT-FUSE for all OPTIONs on OPTIBO
TP2 CAN0_L
TP1 CAN0_H
CANDI V2.0 TECAN AG
LABEL
CAN OUT
C24
C23
J6
1
FEMALE
C21
C22
OPTION
C7
C8
C5
C6
J2
C11
C12
C9
C10
J3
C15
C16
C13
C14
J4
C19
C20
J5
C17
C18
FEMALE
TITLE: ASSEMBLY COMPONENT SIDE
FOR : CANDI V2.0-A
CORRESPONDING SCHEMATIC: CANDI V2.0-A
DOC.NR:
PROJEKT: GENESIS
RA3-JOB: CANDI V2.0
CREATED: S.MUELLER DATE: 24.04.95
CHECKED: U.KNECHT DATE: 24.04.95
DOC.NR: 02009007
SHEET 1 OF 1
TECAN AG
REV
BY
DATE

2010219 V1.0 Block schematics


SIGNAL LAMP
KombiSIGN 70
DOORLOCK 1 (left)
0750270
DOORLOCK 2 (right)
0750270
DOORLOCK 3
0750270
DOORLOCK 4
0750270
2010178.V1.0
(2.95m)
2010177.V1.0
(1.15m)
SMIO
2009706.V1.2
J25
J24
J23
J22
J21
J20
J19
J18
J4
J5
J6
J7
J8
J1
J3
J2
Pause/Resume
Button
701021
2010216.V1.0
(2.8m)
P4
Optibo PCB
2008908.V2.0A
J1
J7
J8
J9
J 10
Genesis
Instrument
RSP / RMP / RWS
Power Module
200
Power cord
External
Power
Switch
701020
0 1
Block Symbols
Block-Frame
Position
Modul-Name
Artikelnummer
Steckerbezeichnung
P01
Block 01
201xxxx.V1.0A
J1
J2
J3
Connections
Position
nn
200nnnn.Vn.n
Part-No.
Misc Definition
=> Not implemented in this phase
■ = terminated (Switch on or Jumper set)
□ = open (Switch off or Jumper not set)
Signals
24V => Power 24V
5V => Power 5V
AC => Power AC
S-CAN => SystemCan
O-CAN => OptionCan
L-CAN => LocalCan
=> unshielded connection
=> shielded connection
Grounding
Instrument
Ground connection:
Earth Ground (Chassis) and Power Ground are connected as follows:
direct
through capacitors
Project: Safety
Modul: 9-BS Safety Modules
Block Schematics
TECAN SCHWEIZ AG
Seestr. 103
CH-8708 Männedorf
TECAN
Seite
1/1
Version
2010219.V1.0
Name
FrDo
Date
30.05.01
checked
Date
Change
A
B
C
D
E
F
1
2
3
4
5
6
7
8

2009706V.1.2A p.1 Schematics


CAD JOB SMIO
41002480 A
ERSTELLT 30.9.99 E.Meier
GEAENDERT 3.1.00 P.Muersel
GEPRUEFT
TECAN
8634 Hombrechtikon
SMIO
ES-2009706.V12 A
TECAN
BLATT 1/2
ERSATZ FUER
ERSETZT DURCH
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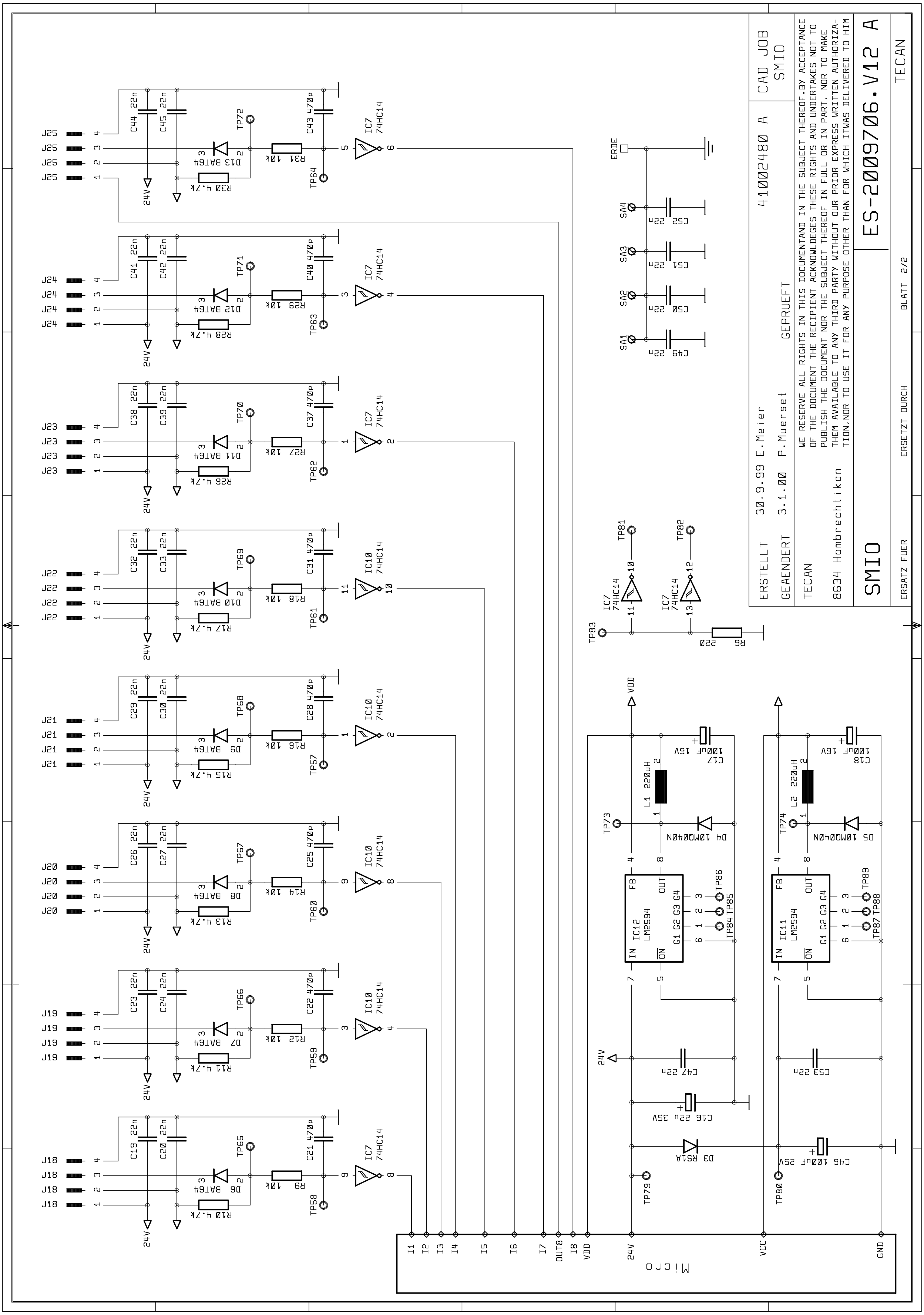
IC1 H8/3644
IC2 SJA1000
IC3 LTC1263
IC4 UDN2987
IC5 X24C16
IC6 MAX233
IC8 SI9200
IC9 MAX705CPA
IC10 74HC14
T1 BSP319
T2 BC817-25
D15 ZMY24
D14 BAT64
D1 RS1A
D2 BL-H232
SQ1 16MHz
SW1
J1
Input/Speisung
IC7 74HC14 14 VCC 7 GND
IC10 74HC14 14 VCC 7 GND
IC8 Si9200 3 VCC 8 GND 2 GND

2009706V.1.2A p.2 Schematics


CAD JOB
SMIO
41002480 A
GEPRUEFT
ERSTELLT 30.9.99 E.Meier
GEAENDERT 3.1.00 P.Muersel
TECAN
8634 Hombrechtikon
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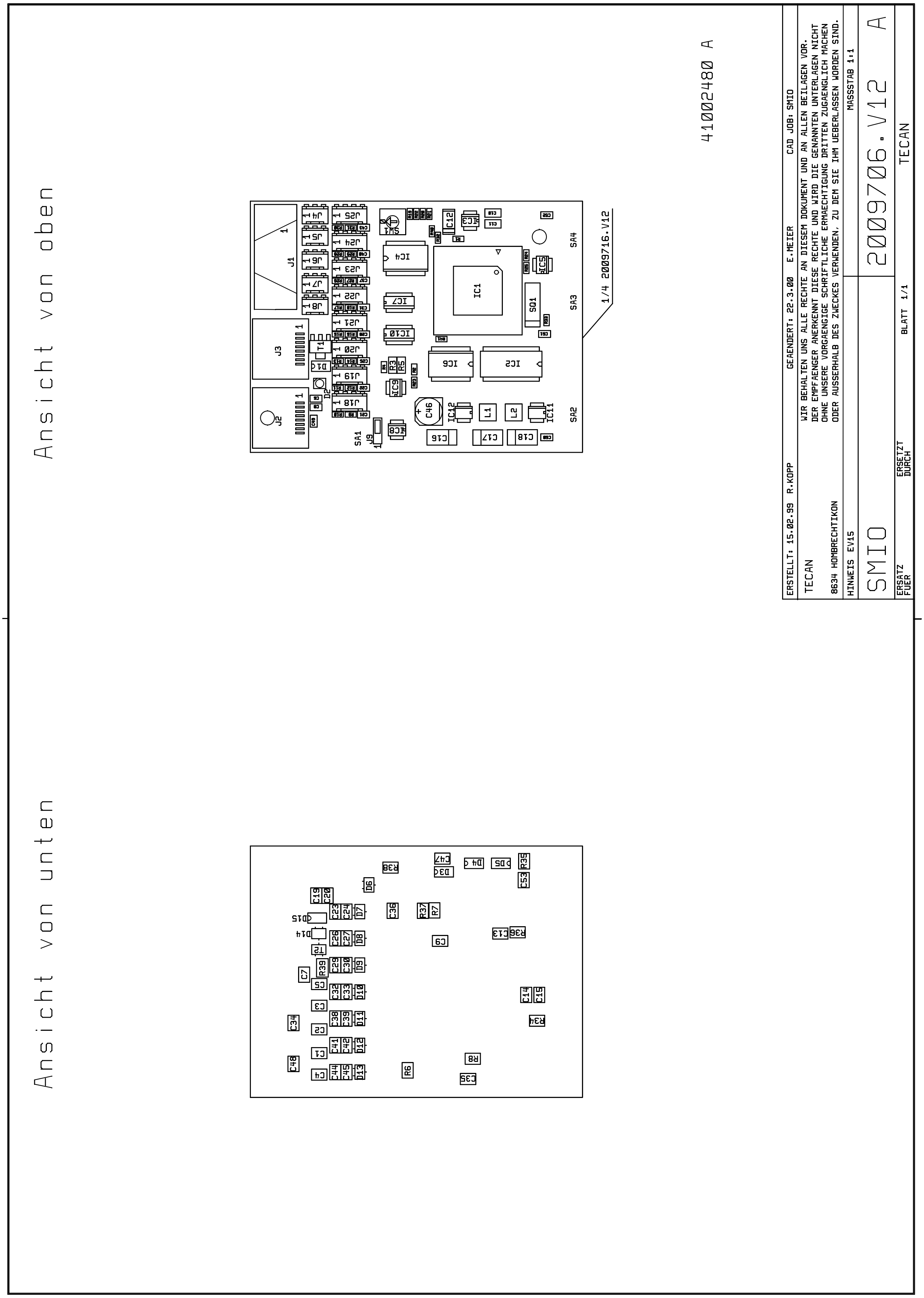
SMIO
ES-2009706.V12 A
TECAN
ERSATZ FUER
ERSETZT DURCH
BLATT 2/2
J18 J19 J20 J21 J22 J23 J24 J25
IC7 74HC14
IC10 74HC14
BAT64
24V
ERDE
SA1 SA2 SA3 SA4
C49 22n C50 22n C51 22n C52 22n
R6 220
IC12 LM2594
IC11 LM2594
L1 220uH
L2 220uH
D4 10MQ040N
D5 10MQ040N
C17 100uF 16V
C18 100uF 16V
C47 22n
C53 22n
C16 22u 35V
C46 100uF 25V
D3 RS1A
VDD
I1 I2 I3 I4 I5 I6 I7 OUT8 I8 VDD 24V VCC GND
Micro

2009706 V.1.2A Assembly


Ansicht von oben
Ansicht von unten
41002480 A
1/4 2009716.V12
J1
J2
J3
J4
J5
J6
J7
J8
J9
J18
J19
J20
J21
J22
J23
J24
J25
IC1
IC2
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
C12
C16
C17
C18
C46
L1
L2
SO1
SW1
T1
T2
D1
SA1
SA2
SA3
SA4
R3
R5
R6
R7
R8
R34
R35
R36
R37
R38
R39
C1
C2
C3
C4
C5
C7
C9
C13
C14
C15
C19
C20
C23
C24
C26
C27
C28
C30
C32
C33
C34
C35
C36
C38
C39
C41
C42
C44
C45
C47
C48
C53
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
ERSTELLT: 15.02.99 R.KOPP
GEAENDERT: 22.3.00 E.MEIER
CAD JOB: SMIO
TECAN
WIR BEHALTEN UNS ALLE RECHTE AN DIESEM DOKUMENT UND AN ALLEN BEILAGEN VOR. DER EMPFAENGER ANERKENNT DIESE RECHTE UND WIRD DIE GENANNTEN UNTERLAGEN NICHT OHNE UNSERE VORGAENGIGE SCHRIFTLICHE ERMAECHTIGUNG DRITTEN ZUGAENGLICH MACHEN ODER AUSSERHALB DES ZWECKES VERWENDEN, ZU DEM SIE IHM UEBERLASSEN WORDEN SIND.
8634 HOMBRECHTIKON
HINWEIS EV15
MASSSTAB 1:1
SMIO
2009706.V12
A
ERSATZ FUER
ERSATZT DURCH
BLATT 1/1
TECAN

9.3 Liquid System

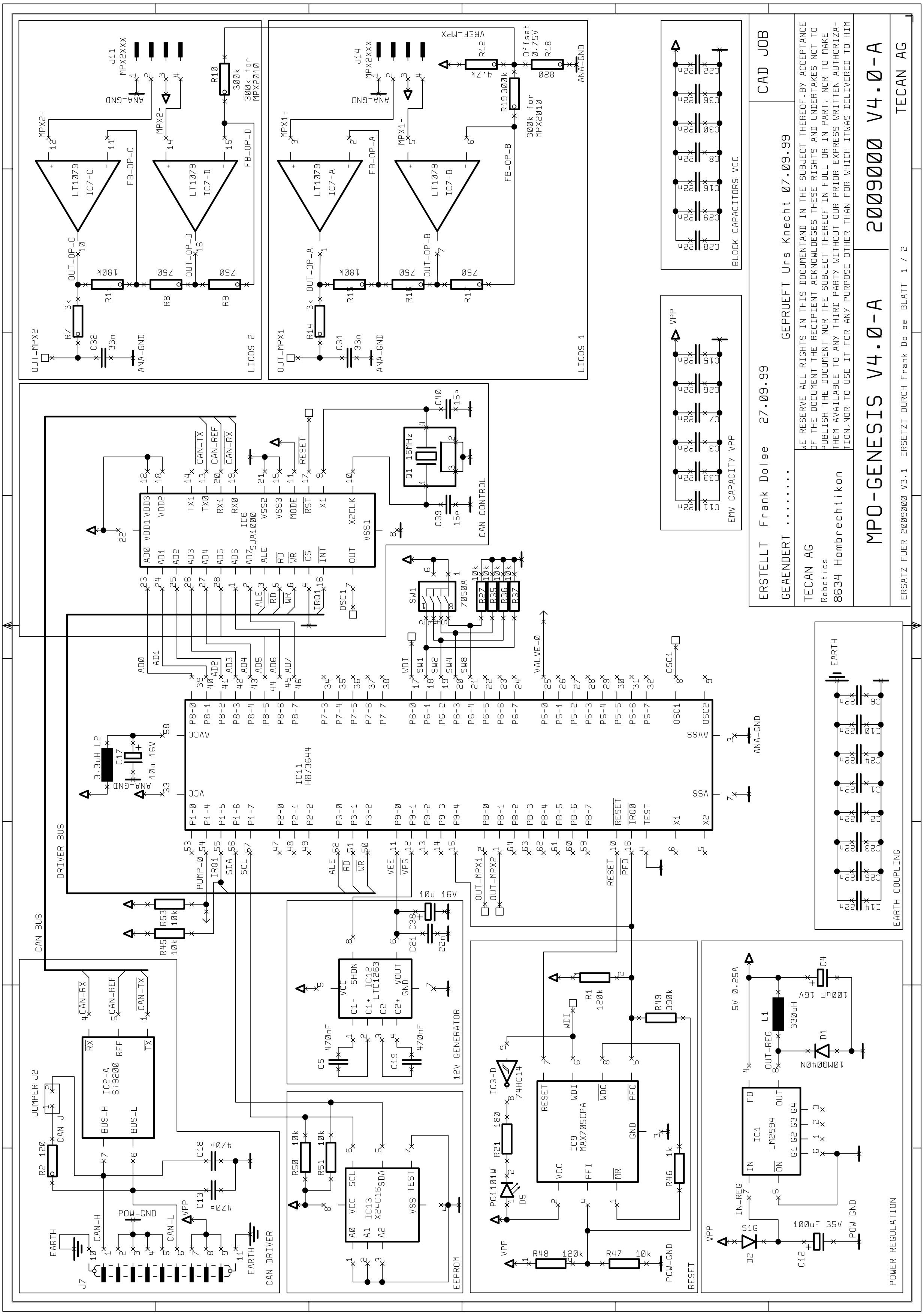
9.3.1 MPO/FWO

Find the following diagrams filed hereafter:

MPO Board

Drawing No	Title	Valid for	Page
2009000 V4.0A p.1	Schematics	MPO board V4.0	9 – 41
2009000 V4.0A	Assembly component sides	MPO board V4.0	9 – 42
2009000 V4.0A	Assembly solder side	MPO board V4.0	9 – 43

2009000 V4.0A p.1 Schematics


MPO-GENESIS V4.0-A
2009000 V4.0-A
TECAN AG
CAD JOB
ERSTELLT Frank Dolse 27.09.99
GEPRUEFT Urs Knecht 07.09.99
GEAENDERT ....
TECAN AG Robotics 8634 Hombrechtikon
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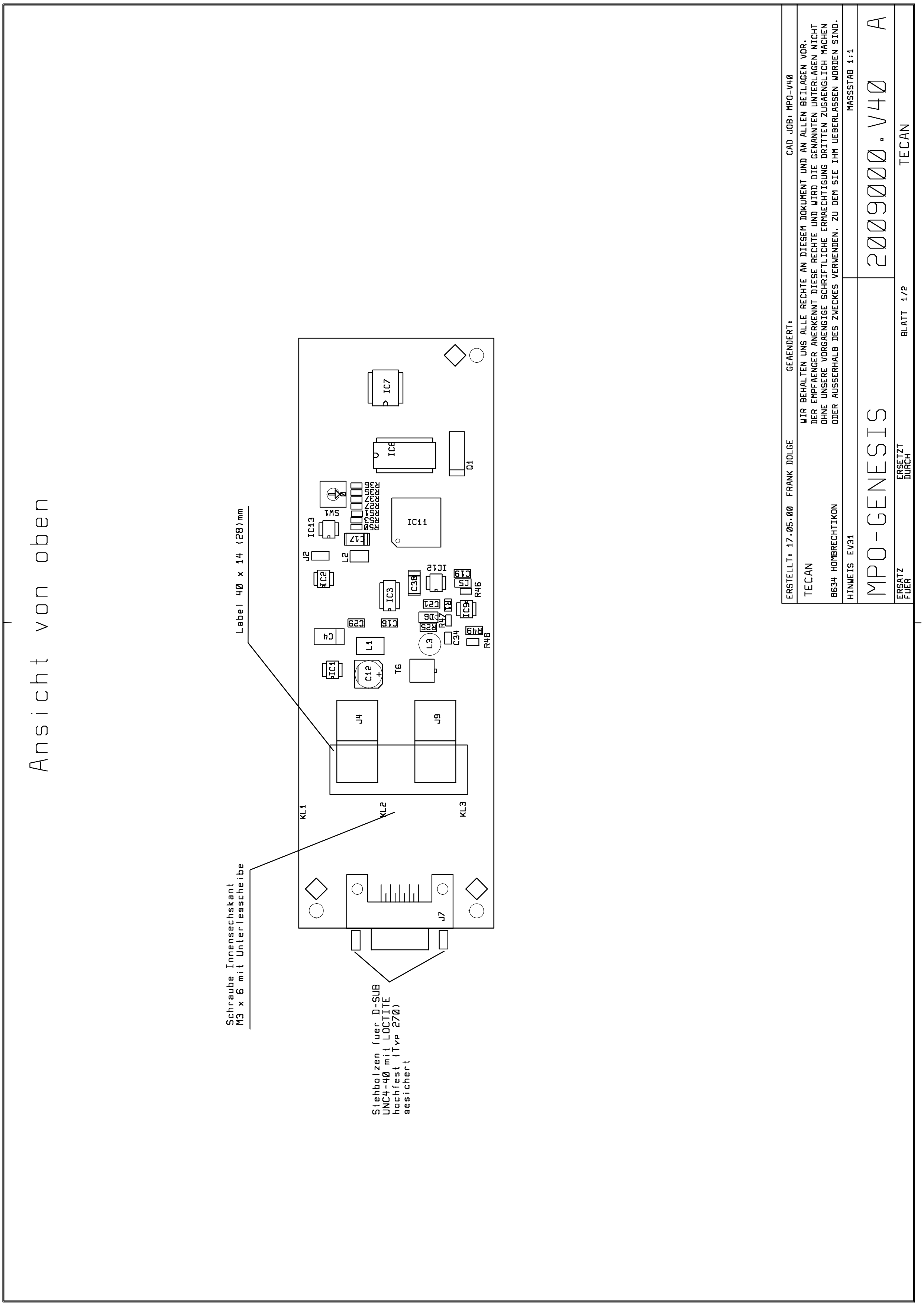
ERSATZ FUER 2009000 V3.1 ERSETZT DURCH Frank Dolse BLATT 1 / 2
LICOS 2
LICOS 1
LT1079 IC7-C
LT1079 IC7-D
LT1079 IC7-A
LT1079 IC7-B
J11 MPX2XXX
J14 MPX2XXX
OUT_MPX2
OUT_MPX1
VREF-MPX
ANA-GND
BLOCK CAPACITORS VCC
EMV CAPACITY VPP
CAN CONTROL
IC6 SJA1000
Q1 16MHz
SW1 7050A
IC11 H8/3644
DRIVER BUS
CAN BUS
EARTH COUPLING
CAN DRIVER
IC2-A Si9200
JUMPER J2
J7
12V GENERATOR
IC12 LTC1263
EEPROM
IC13 X24C16
RESET
IC9 MAX705CPA
IC3-D 74HC14
POWER REGULATION
IC1 LM2594
5V 0.25A
POW-GND
VPP
EARTH

2009000 V4.0A Assembly component sides


IC7
IC8
Q1
IC11
SW1
IC13
R50
R30
R31
R41
R27
R32
R22
R26
R20
C17
J2
L2
C2
IC12
C19
C38
IC3
C5
R46
C21
R1
IC9
D6
R25
R47
C29
C16
C4
L1
L3
C34
R49
R48
IC1
C12
T6
J4
J9
KL1
KL2
KL3
J7

Ansicht von oben

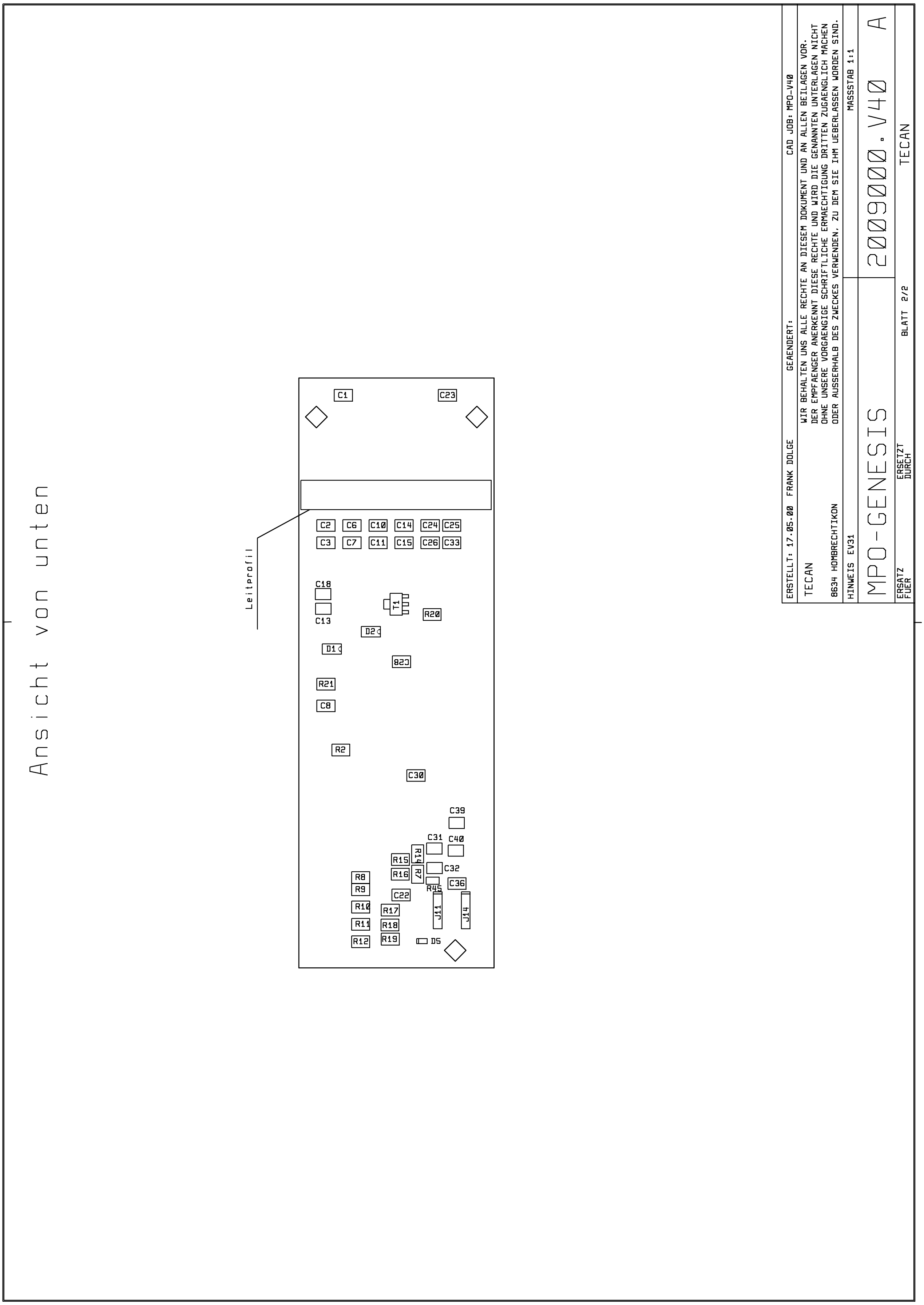
Label 40 x 14 (28)mm

Schraube Innensechskant M3 x 6 mit Unterlegscheibe

Stehbolzen fuer D-SUB UNC4-40 mit LOCTITE hochfest (Typ 270) gesichert

ERSTELLT: 17.05.00 FRANK DOLGE
GEAENDERT:
CAD JOB: MPO-V40
TECAN
8634 HOMBRECHTIKON
WIR BEHALTEN UNS ALLE RECHTE AN DIESEM DOKUMENT UND AN ALLEN BEILAGEN VOR. DER EMPFAENGER ANERKENNT DIESE RECHTE UND WIRD DIE GENANNTEN UNTERLAGEN NICHT OHNE UNSERE VORGAENGIGE SCHRIFTLICHE ERMAECHTIGUNG DRITTEN ZUGAENGLICH MACHEN ODER AUSSERHALB DES ZWECKES VERWENDEN, ZU DEM SIE IHM UEBERLASSEN WORDEN SIND.
HINWEIS EV31
MASSSTAB 1:1
MPO-GENESIS 2009000.V40 A
ERSATZ FUER
ERSETZT DURCH
BLATT 1/2
TECAN

2009000 V4.0A Assembly solder side


Ansicht von unten
Leitprofil
C1
C23
C2
C6
C10
C14
C24
C25
C3
C7
C11
C15
C26
C33
C18
C13
T1
R20
D2
D1
C28
R21
C8
R2
C30
C39
C31
C40
R14
R15
R16
R7
C32
R45
C36
R8
R9
C22
R10
R17
J11
J14
R11
R18
R12
R19
D5
ERSTELLT: 17.05.00 FRANK DOLGE
GEAENDERT:
CAD JOB: MPO-V40
TECAN
8634 HOMBRECHTIKON
HINWEIS EV31
MASSSTAB 1:1
MPO-GENESIS
2009000.V40 A
ERSATZ FUER
ERSETZT DURCH
BLATT 2/2
TECAN

WIR BEHALTEN UNS ALLE RECHTE AN DIESEM DOKUMENT UND AN ALLEN BEILAGEN VOR. DER EMPFAENGER ANERKENNT DIESE RECHTE UND WIRD DIE GENANNTEN UNTERLAGEN NICHT OHNE UNSERE VORGAENGIGE SCHRIFTLICHE ERMAECHTIGUNG DRITTEN ZUGAENGLICH MACHEN ODER AUSSERHALB DES ZWECKES VERWENDEN, ZU DEM SIE IHM UEBERLASSEN WORDEN SIND.

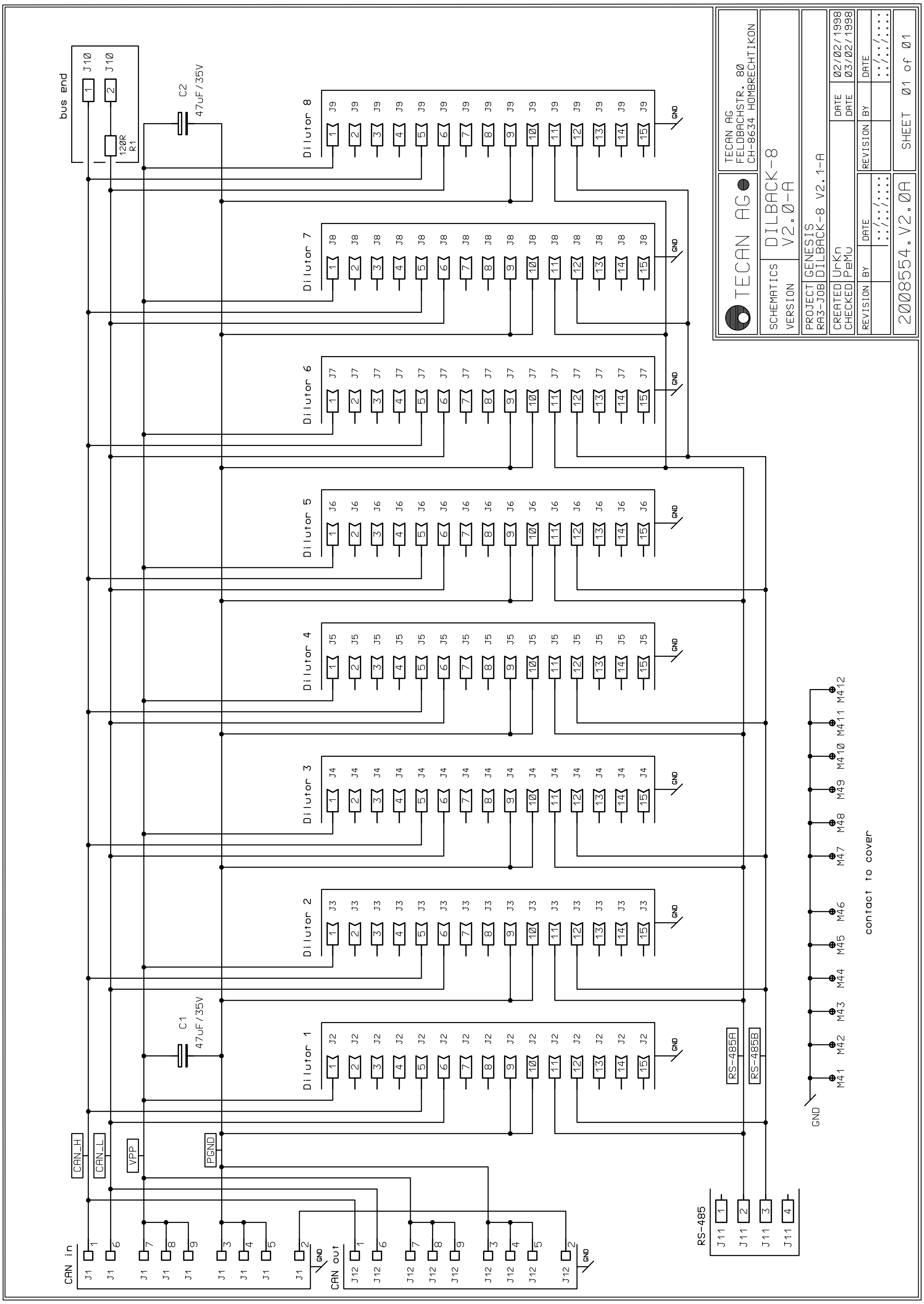
9.3.2 Diluter/Dilback

Find the following diagrams filed hereafter:

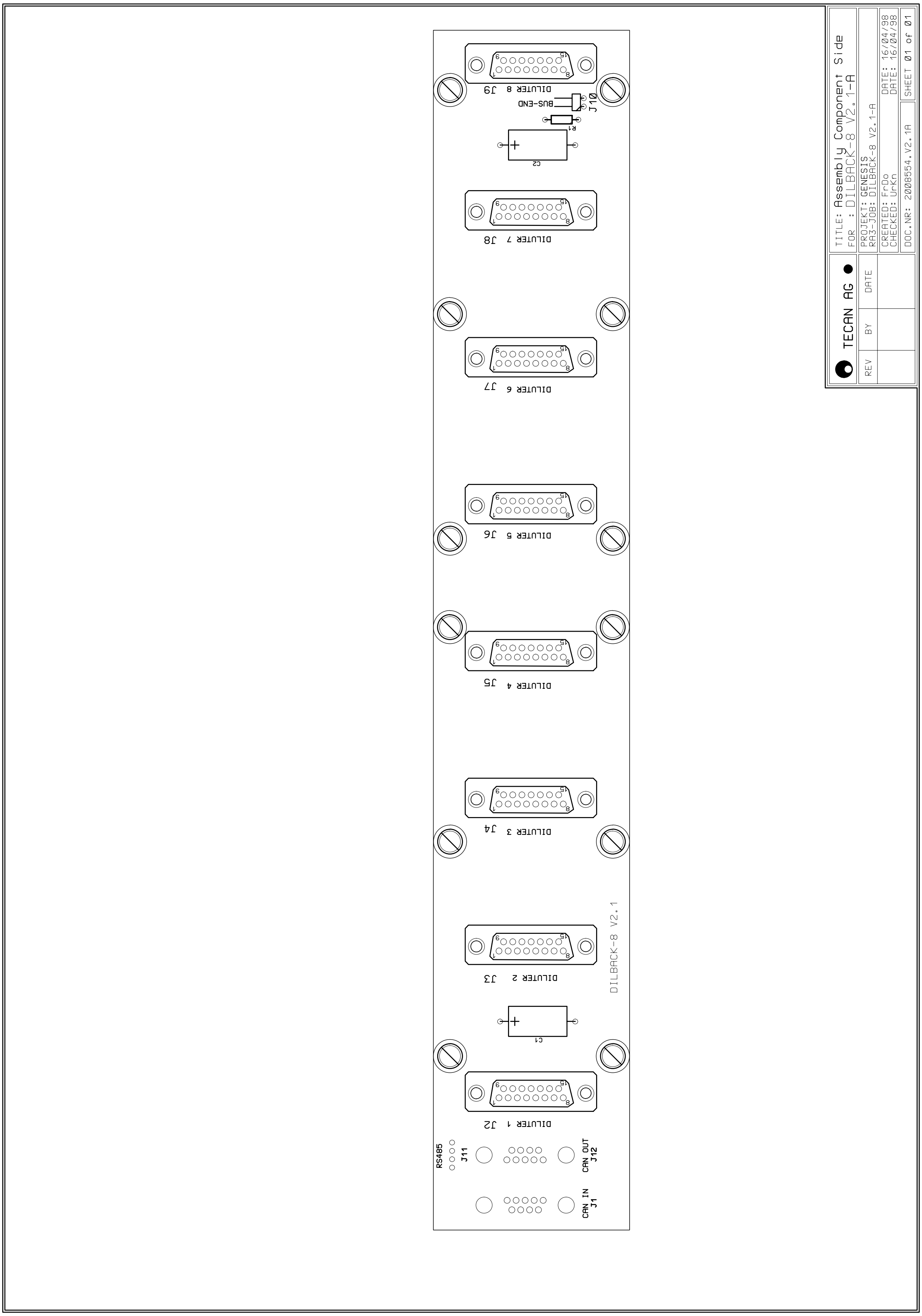
Dilback

Drawing No	Title	Valid for	Page
2008554 V.2.0A	Schematics	Dilback-8	9 – 45
2008554 V.2.1A	Assembly component side	Dilback-8	9 – 46
2008554 V.2.1A	Assembly solder side	Dilback-8	9 – 47

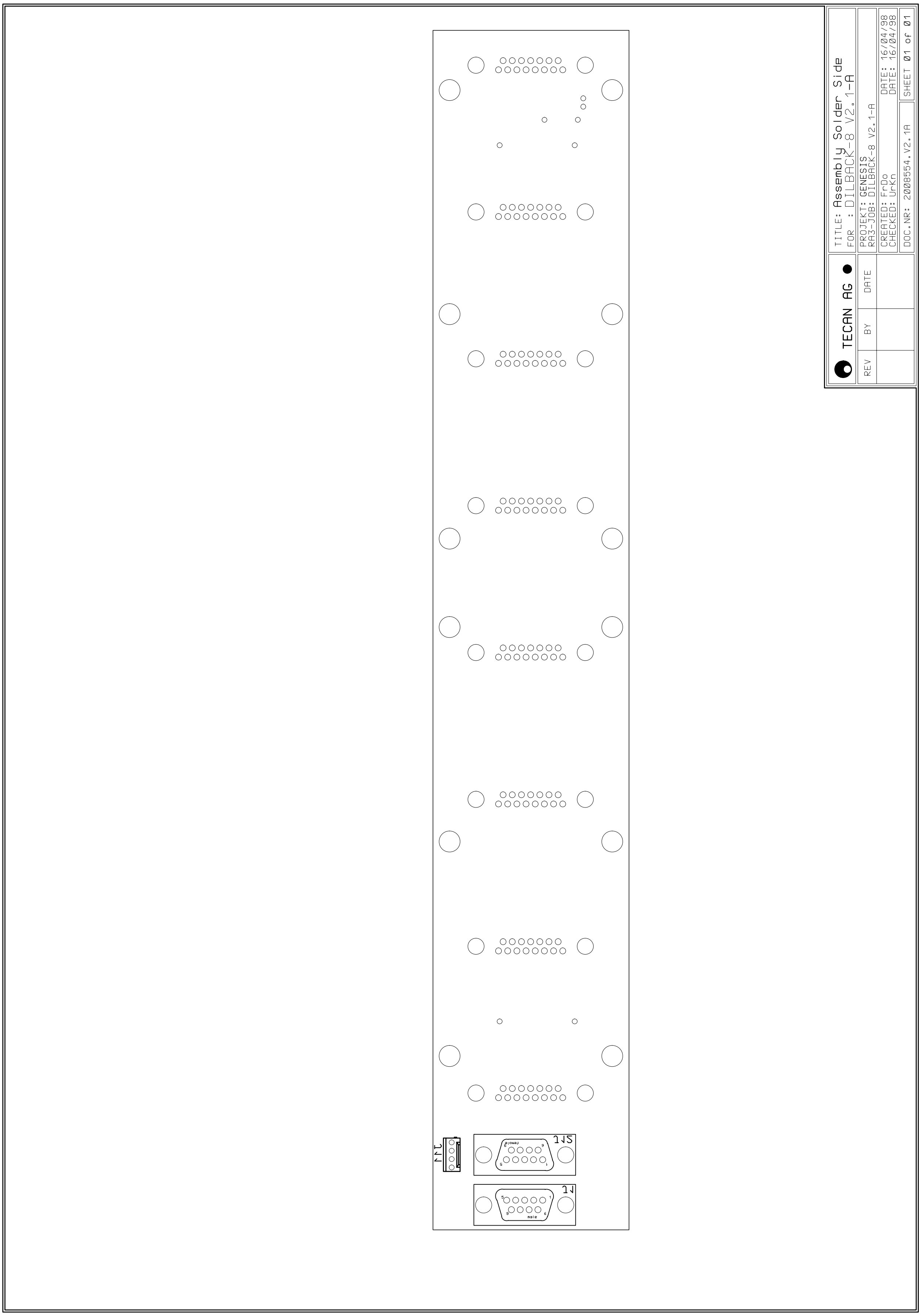
2008554 V.2.0A Schematics


bus end
J10 1
J10 2
120R
R1
C2
47uF/35V
C1
47uF/35V
Dilutor 1
Dilutor 2
Dilutor 3
Dilutor 4
Dilutor 5
Dilutor 6
Dilutor 7
Dilutor 8
J2
J3
J4
J5
J6
J7
J8
J9
GND
CAN_H
CAN_L
VPP
PGND
CAN in
J1
CAN out
J12
RS-485
J11
RS-485A
RS-485B
M41
M42
M43
M44
M45
M46
M47
M48
M49
M410
M411
M412
contact to cover
TECAN AG
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON
TECAN AG
SCHEMATICS DILBACK-8
VERSION V2.0-A
PROJECT GENESIS
RA3-JOB DILBACK-8 V2.1-A
CREATED UrKn DATE 02/02/1998
CHECKED PeMu DATE 03/02/1998
REVISION BY DATE
2008554.V2.0A
SHEET 01 of 01

2008554 V.2.1A Assembly component side


TECAN AG
REV
BY
DATE
TITLE: Assembly Component Side
FOR : DILBACK-8 V2.1-A
PROJEKT: GENESIS
RA3-JOB: DILBACK-8 V2.1-A
CREATED: FrDo
CHECKED: UrKn
DATE: 16/04/98
DATE: 16/04/98
DOC.NR: 2008554.V2.1A
SHEET 01 of 01
DILUTER 8 J9
BUS-END
J10
R1
C2
DILUTER 7 J8
DILUTER 6 J7
DILUTER 5 J6
DILUTER 4 J5
DILUTER 3 J4
DILBACK-8 V2.1
DILUTER 2 J3
C1
DILUTER 1 J2
RS485
J11
CAN OUT
J12
CAN IN
J1

2008554 V.2.1A Assembly solder side


TITLE: Assembly Solder Side
FOR : DILBACK-8 V2.1-A
PROJEKT: GENESIS
RA3-JOB: DILBACK-8 V2.1-A
CREATED: FrDo DATE: 16/04/98
CHECKED: UrKn DATE: 16/04/98
DOC.NR: 2008554.V2.1A
SHEET 01 of 01
TECAN AG
REV
BY
DATE

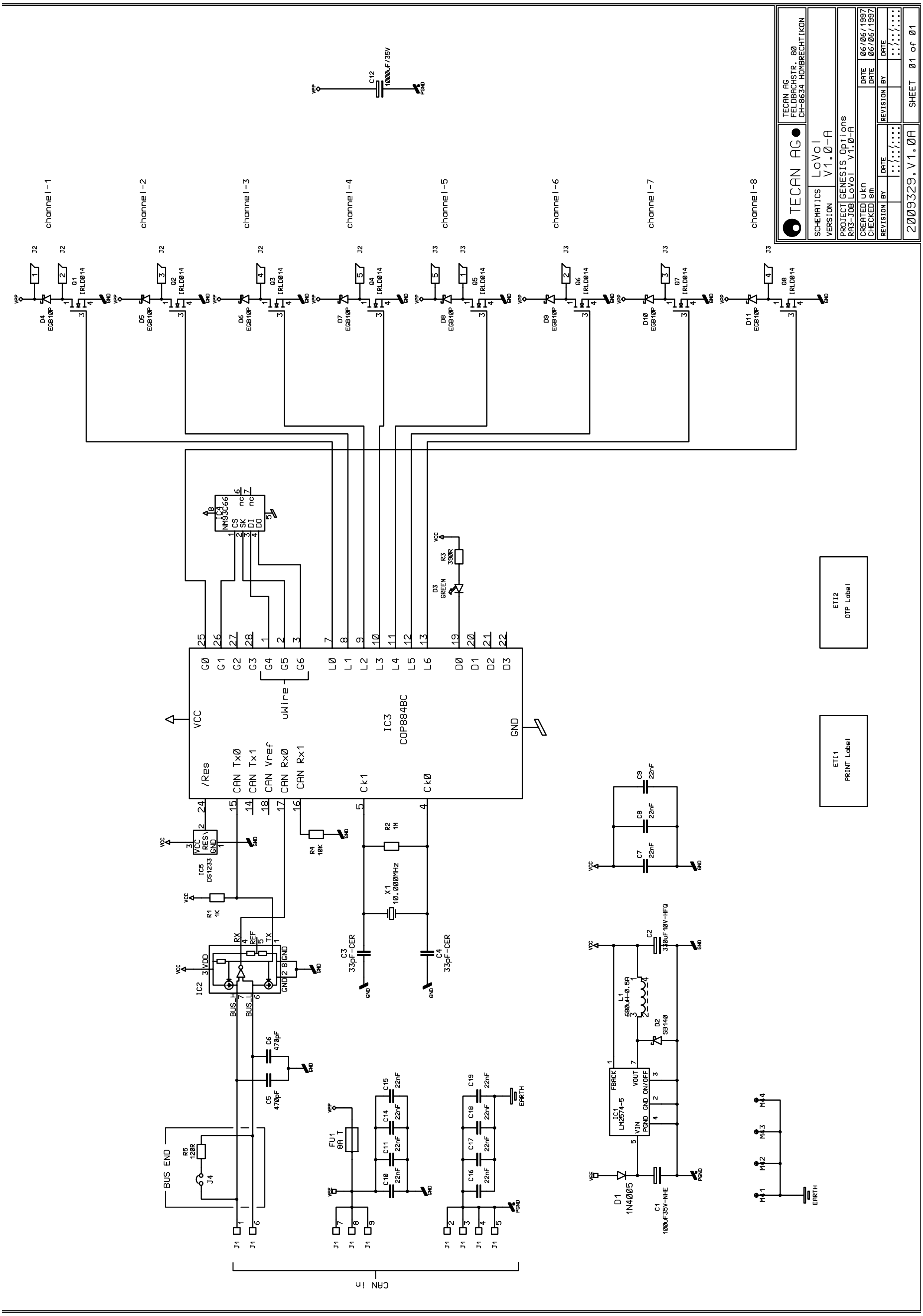
9.3.3 Low Volume Option

Find the following diagrams filed hereafter:

Low Volume Main Board

Drawing No	Title	Valid for	Page
2009329 V.1.0A	Schematics	Low volume option 1 and 2	9 – 49
2009329 V.1.0A	Assembly component side	Low volume option 1 and 2	9 – 50

2009329 V.1.0A Schematics


channel-1
channel-2
channel-3
channel-4
channel-5
channel-6
channel-7
channel-8
IC3 COP884BC
IC4 NM93C66
IC5 DS1233
IC2
IC1 LM2574-5
X1 10.000MHz
C12 1000uF/35V
ETI1 PRINT Label
ETI2 OTP Label
BUS END
CAN in
TECAN AG
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON
SCHEMATICS LoVol
VERSION V1.0-A
PROJECT GENESIS Options
RA3-JOB LoVol V1.0-A
CREATED ukn DATE 06/06/1997
CHECKED sm DATE 06/06/1997
2009329.V1.0A
SHEET 01 of 01

2009329 V.1.0A Assembly component side

TECAN AG
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON

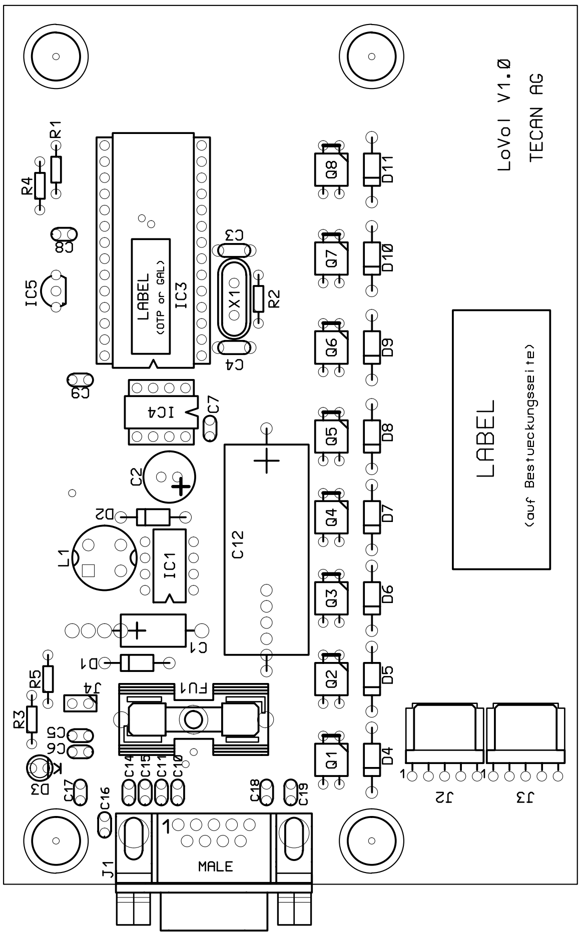
TITLE ASSEMBLY COMPONENT SIDE
FOR LoVol V1.0-A

PROJECT GENESIS RSP OPTION
RA3-JOB LoVol V1.0-A

CREATED UKN 06/06/97
CHECKED SM 06/06/97

REVISION
RELEASED

DOC.NR 2009329.V1.0A
SHEET 01 of 01


R1
R4
C8
IC5
C9
LABEL (OTP or GAL)
IC3
C3
X1
R2
C4
IC4
C7
C2
D2
L1
IC1
C12
C1
D1
R5
J4
FU1
R3
C5
C6
D3
C17
C16
C14
C15
C11
C10
C18
C19
J1
MALE
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
D4
D5
D6
D7
D8
D9
D10
D11
J2
J3
LABEL
(auf Bestueckungsseite)
LoVol V1.0
TECAN AG

9.4 LiHa 1 and LiHa 2

Find the following diagrams filed hereafter:

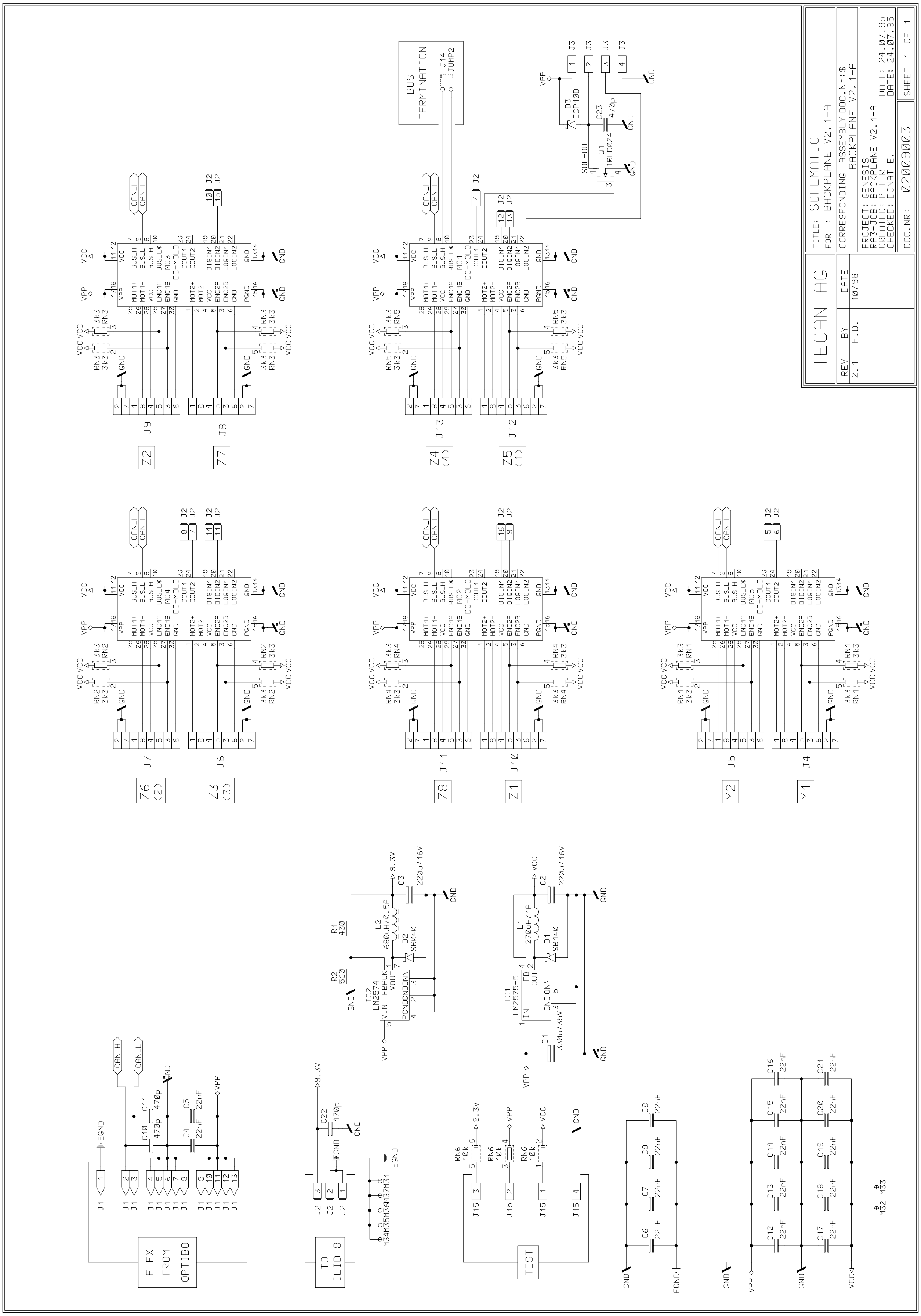
LiHa 2 Backplane

Drawing No	Title	Valid for	Page
2009003 V.2.1A	Schematics	LiHa 1 and 2	9 – 52
2009003 V.2.1B	Assembly component side	LiHa 1 and 2	9 – 53

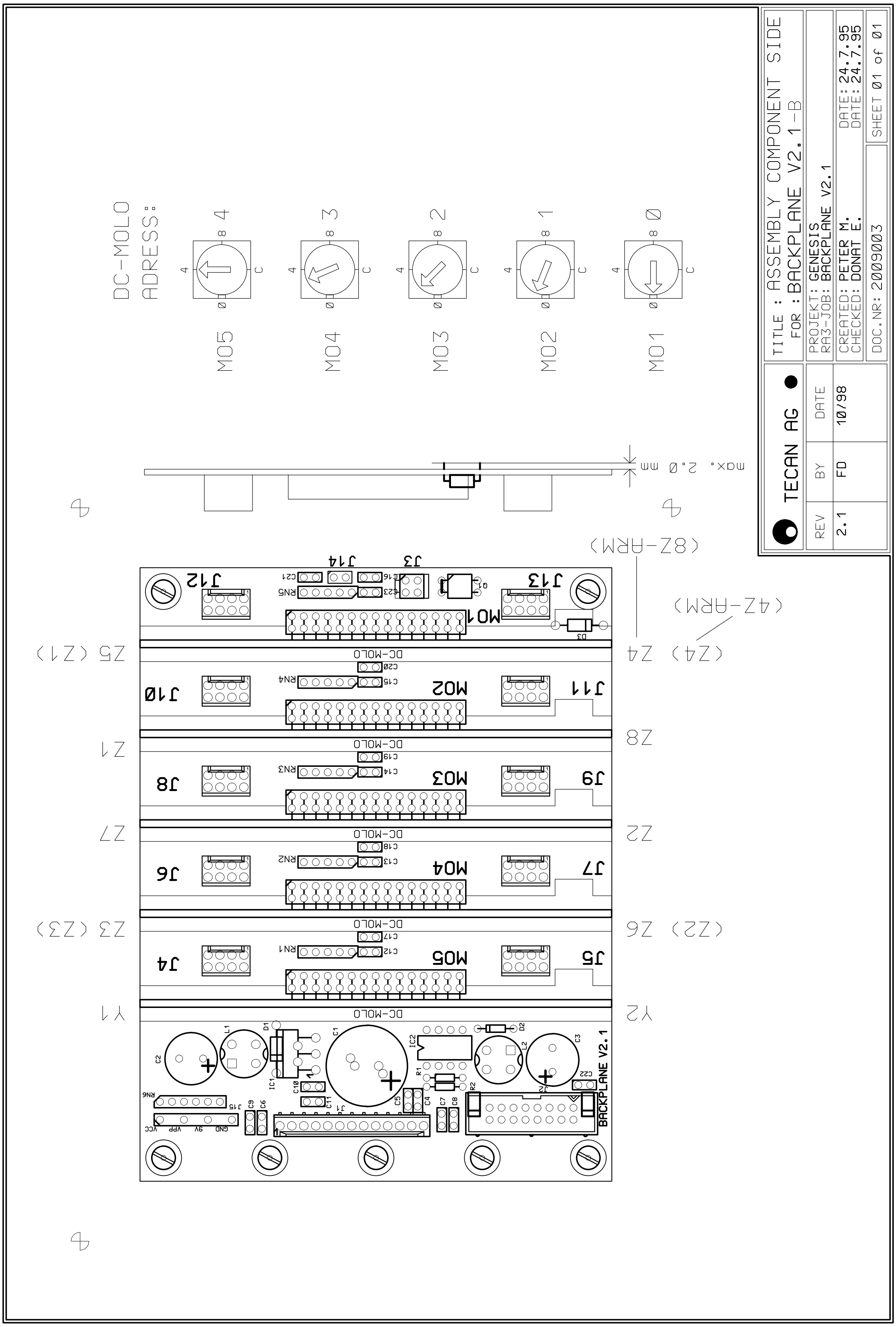
ILID Board

Drawing No	Title	Valid for	Page
2009005 V.2.0A	Schematics	LiHa 1 and 2	9 – 54
2009005 V.2.0B	Assembly component side	LiHa 1 and 2	9 – 55

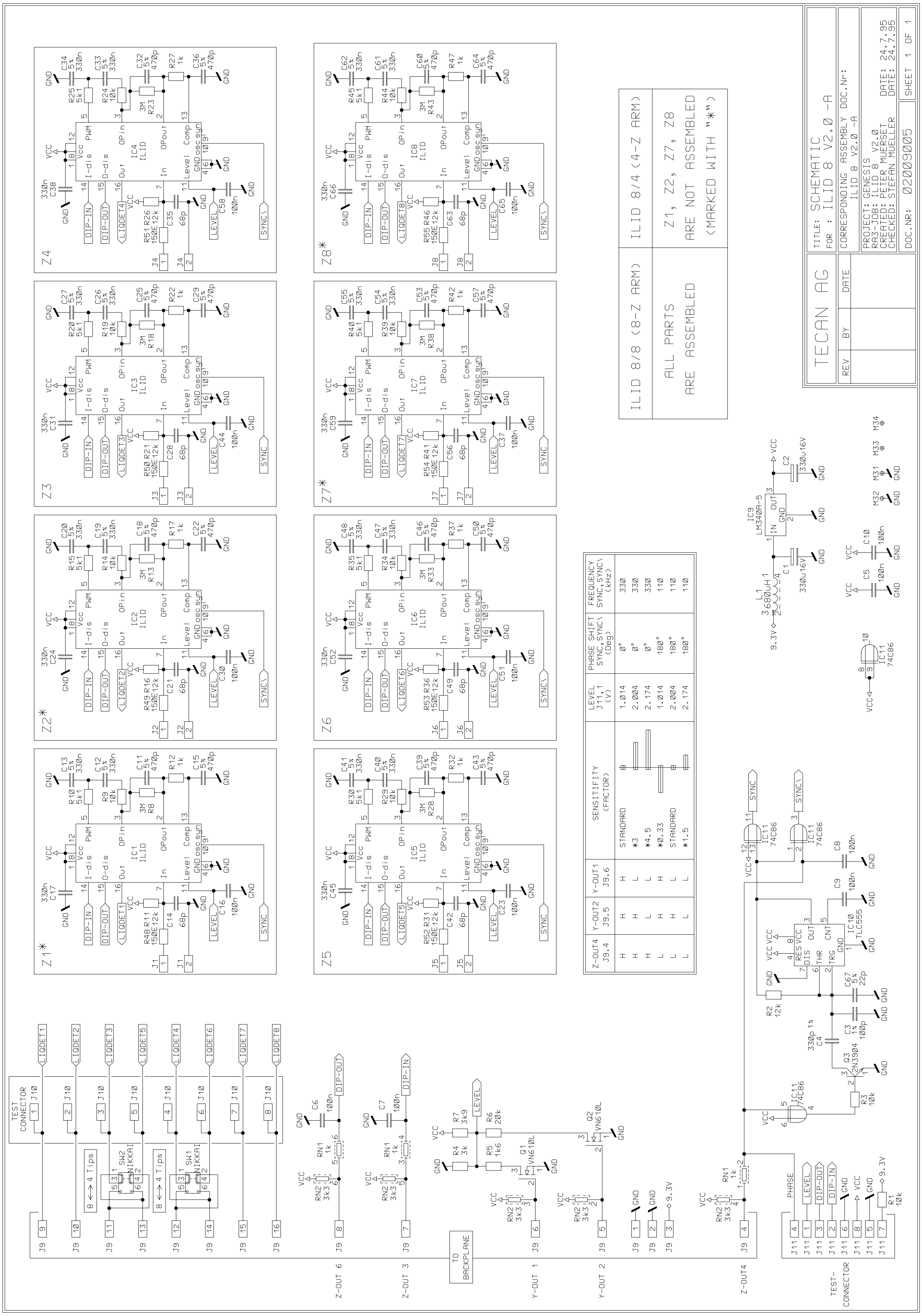
2009003 V.2.1A Schematics


TITLE: SCHEMATIC
FOR : BACKPLANE V2.1-A
CORRESPONDING ASSEMBLY DOC.Nr:$ BACKPLANE V2.1-A
PROJECT: GENESIS
RA3-JOB: BACKPLANE V2.1-A
CREATED: PETER
CHECKED: DONAT E.
DATE: 24.07.95
DATE: 24.07.95
DOC.NR: 02009003
SHEET 1 OF 1
TECAN AG
REV 2.1
BY F.D.
DATE 10/98
BUS TERMINATION
J14 JUMP2
D3 EGP10D
C23 470p
Q1 IRLD024
SOL-OUT
MO1 DC-MOLO
MO2
MO3
MO4
MO5
CAN_H
CAN_L
VCC
VPP
GND
EGND
J9
J8
J13
J12
J7
J6
J11
J10
J5
J4
Z2
Z7
Z4 (4)
Z5 (1)
Z6 (2)
Z3 (3)
Z8
Z1
Y2
Y1
RN1 3k3
RN2 3k3
RN3 3k3
RN4 3k3
RN5 3k3
IC2 LM2574
R1 430
R2 560
L2 680uH/0.5A
D2 SB040
C3 220u/16V
9.3V
IC1 LM2575-5
L1 270uH/1A
D1 SB140
C2 220u/16V
C1 330u/35V
FLEX FROM OPTIBO
C10 470p
C11 470p
C4 22nF
C5 22nF
C22 470p
TO ILID 8
M34 M35 M36 M37 M31
RN6 10k
TEST
J15
C6 22nF
C7 22nF
C8 22nF
C9 22nF
C12 22nF
C13 22nF
C14 22nF
C15 22nF
C16 22nF
C17 22nF
C18 22nF
C19 22nF
C20 22nF
C21 22nF
M32 M33

2009003 V.2.1B Assembly component side

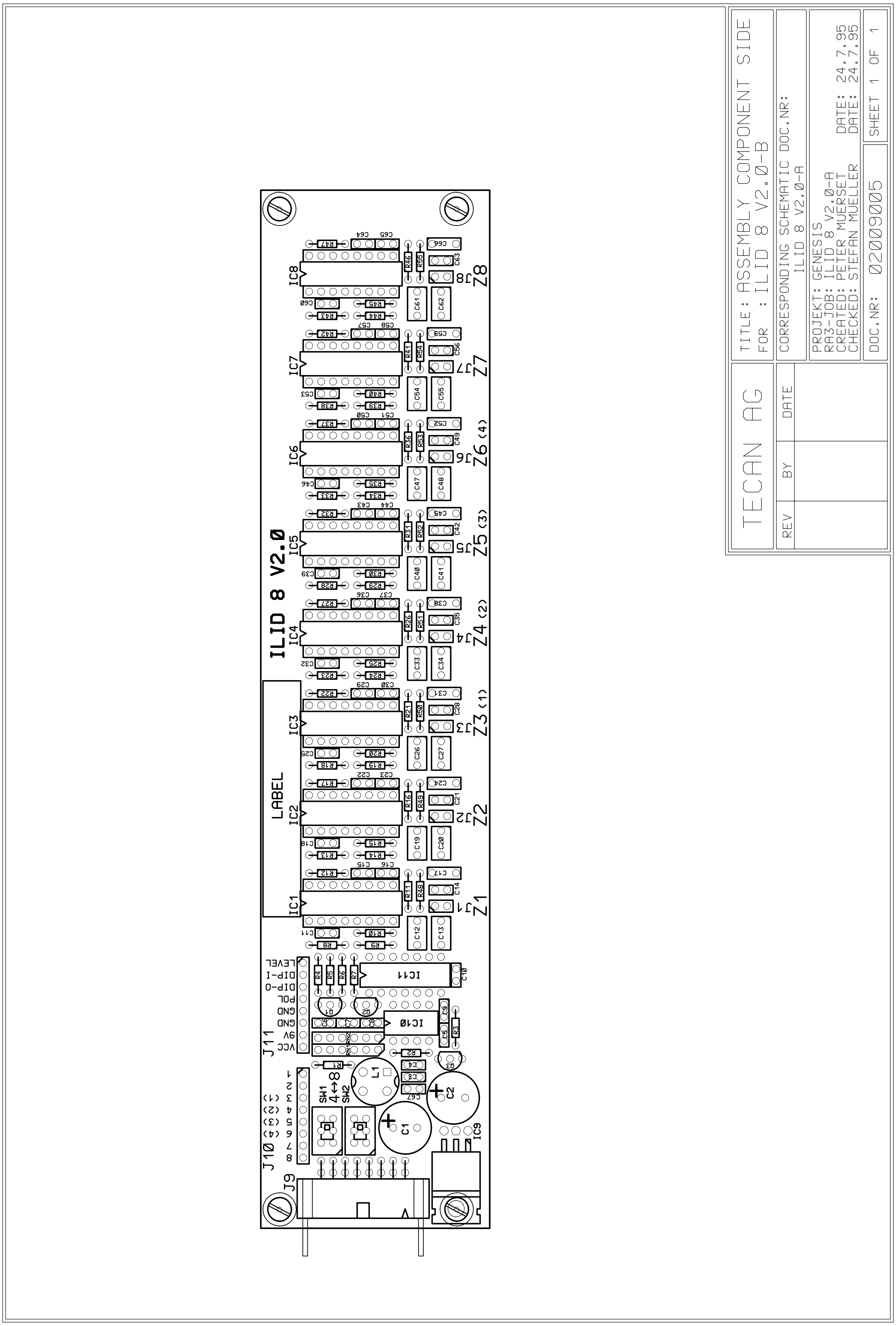

TITLE : ASSEMBLY COMPONENT SIDE
FOR : BACKPLANE V2.1-B
PROJEKT: GENESIS
RA3-JOB: BACKPLANE V2.1
CREATED: PETER M. DATE: 24.7.95
CHECKED: DONAT E. DATE: 24.7.95
DOC.NR: 2009003
SHEET 01 of 01
TECAN AG
REV 2.1
BY FD
DATE 10/98
DC-MOLO ADRESS:
M05 4
M04 3
M03 2
M02 1
M01 0
max. 2.0 mm
(8Z-ARM)
(4Z-ARM)
Z5 (Z1)
Z4 (Z4)
Z1
Z8
Z7
Z2
Z3 (Z3)
Z6 (Z2)
Y1
Y2
J12
J13
J14
J3
J10
J11
J8
J9
J6
J7
J4
J5
M01
M02
M03
M04
M05
DC-MOLO
BACKPLANE V2.1

2009005 V.2.0A Schematics


TECAN AG
REV
BY
DATE
TITLE: SCHEMATIC
FOR : ILID 8 V2.0 -A
CORRESPONDING ASSEMBLY DOC.Nr:
ILID 8 V2.0 -A
PROJECT: GENESIS
RA3-JOB: ILID 8 V2.0
CREATED: PETER MUERSET DATE: 24.7.95
CHECKED: STEFAN MUELLER DATE: 24.7.95
DOC.NR: 02009005
SHEET 1 OF 1
ILID 8/8 (8-Z ARM)
ALL PARTS ARE ASSEMBLED
ILID 8/4 (4-Z ARM)
Z1, Z2, Z7, Z8 ARE NOT ASSEMBLED (MARKED WITH "*")
Z1*
Z2*
Z3
Z4
Z5
Z6
Z7*
Z8*
IC1 ILID
IC2 ILID
IC3 ILID
IC4 ILID
IC5 ILID
IC6 ILID
IC7 ILID
IC8 ILID
IC9 LM340A-5
IC10 TLC555
IC11 74C86
Q1 VN610L
Q2 VN610L
Q3 2N3904
L1 680uH
C1 330u16V
C2 330u16V
SW1 NIKKAI
SW2 NIKKAI
8 <-> 4 Tips
TEST CONNECTOR J10
TEST-CONNECTOR
TO BACKPLANE
DIP-IN
DIP-OUT
LEVEL
SYNC
SYNC\
PHASE
LIQDET1
LIQDET2
LIQDET3
LIQDET4
LIQDET5
LIQDET6
LIQDET7
LIQDET8
Z-OUT 6
Z-OUT 3
Y-OUT 1
Y-OUT 2
Z-OUT4
9.3V
VCC
GND

Z-OUT4 J9.4	Y-OUT2 J9.5	Y-OUT1 J9.6	SENSITIFITY (FACTOR)	LEVEL J11,1 (V)	PHASE SHIFT SYNC,SYNC\ (Deg)	FREQUENCY SYNC,SYNC\ (kHz)
H	H	H	STANDARD	1.014	0°	330
H	H	L	*3	2.004	0°	330
H	L	L	*4.5	2.174	0°	330
L	H	H	*0.33	1.014	180°	110
L	H	L	STANDARD	2.004	180°	110
L	L	L	*1.5	2.174	180°	110

2009005 V.2.0B Assembly component side


TITLE: ASSEMBLY COMPONENT SIDE
FOR : ILID 8 V2.0-B
CORRESPONDING SCHEMATIC DOC.NR:
ILID 8 V2.0-A
PROJEKT: GENESIS
RA3-JOB: ILID 8 V2.0-A
CREATED: PETER MUERSET DATE: 24.7.95
CHECKED: STEFAN MUELLER DATE: 24.7.95
DOC.NR: 02009005
SHEET 1 OF 1
TECAN AG
REV
BY
DATE
ILID 8 V2.0
LABEL
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
Z1
Z2
Z3 (1)
Z4 (2)
Z5 (3)
Z6 (4)
Z7
Z8
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
LEVEL
DIP-I
DIP-O
POL
GND
GND
9V
VCC
1
2
3
4
5
6
7
8
(1)
(2)
(3)
(4)
SW1
SW2
4↔8
C1
C2
L1
Q1
Q2
Q3

9.5 RoMa 1 and RoMa 2

Find the following diagrams filed hereafter:

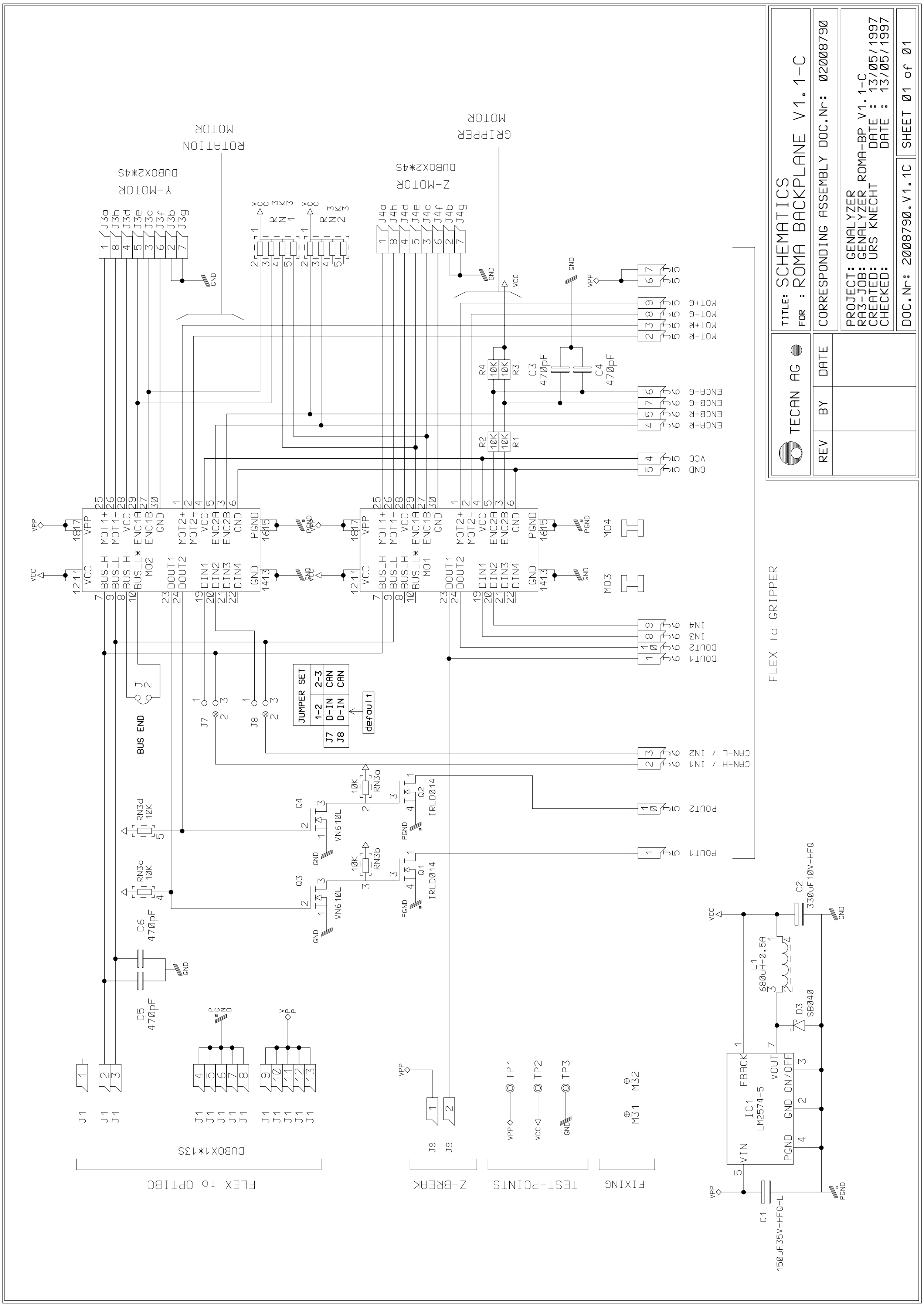
RoMa Backplane

Drawing No	Title	Valid for	Page
2008790 V.1.1C	Schematics	RoMa 1	9 – 57
2008790 V.1.1C	Assembly component side	RoMa 1	9 – 58
2008790 V.1.1C	Assembly solder side	RoMa 1	9 – 59
2008783 V1.2A	Schematics	RoMa 2	9 – 60
2008783 V1.2A	Assembly	RoMa 2	9 – 61

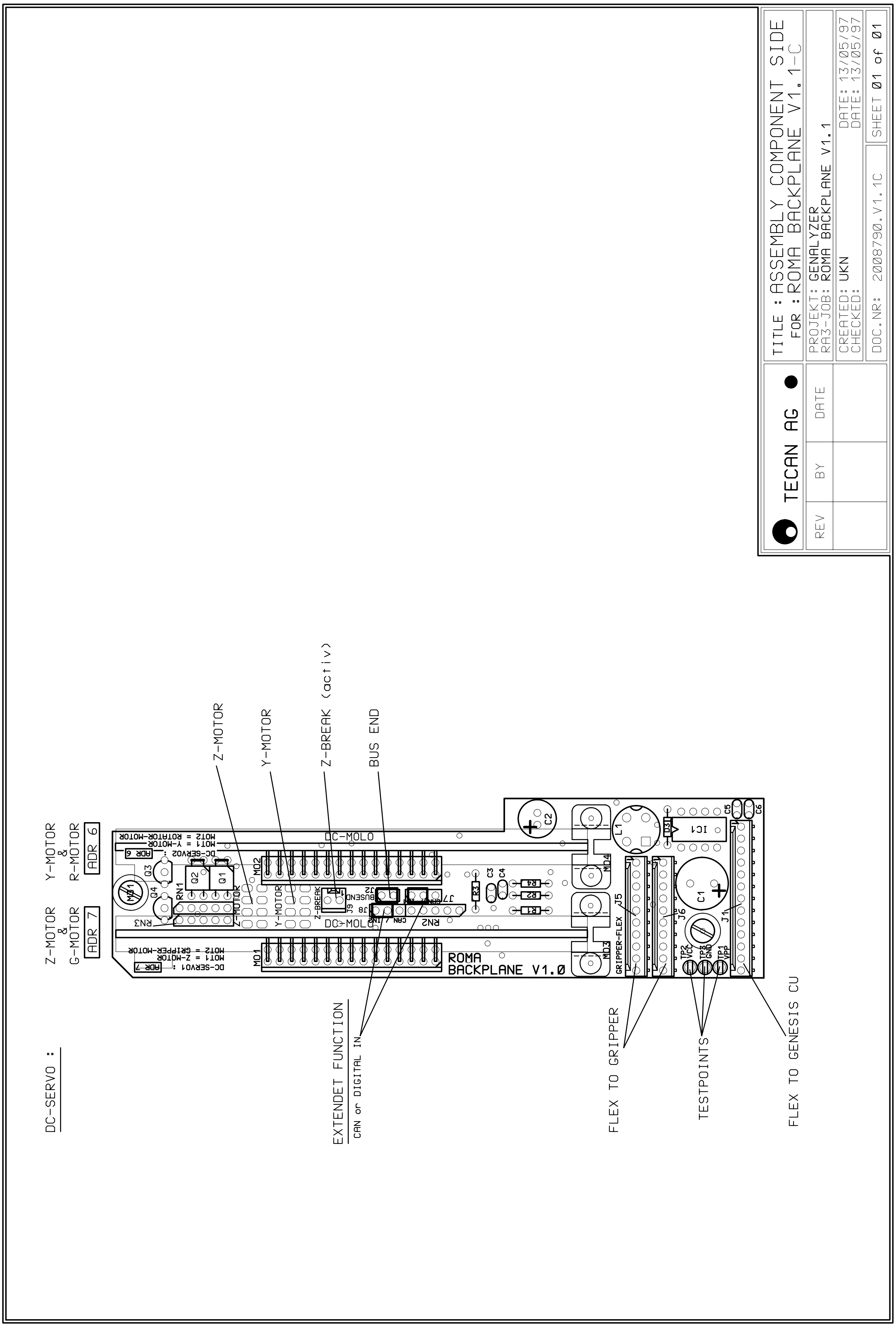
Gripper Board

Drawing No	Title	Valid for	Page
2008794 V.1.0A	Schematics	RoMa 1 and 2	9 – 62
2008794 V.1.0A	Assembly component side	RoMa 1 and 2	9 – 63

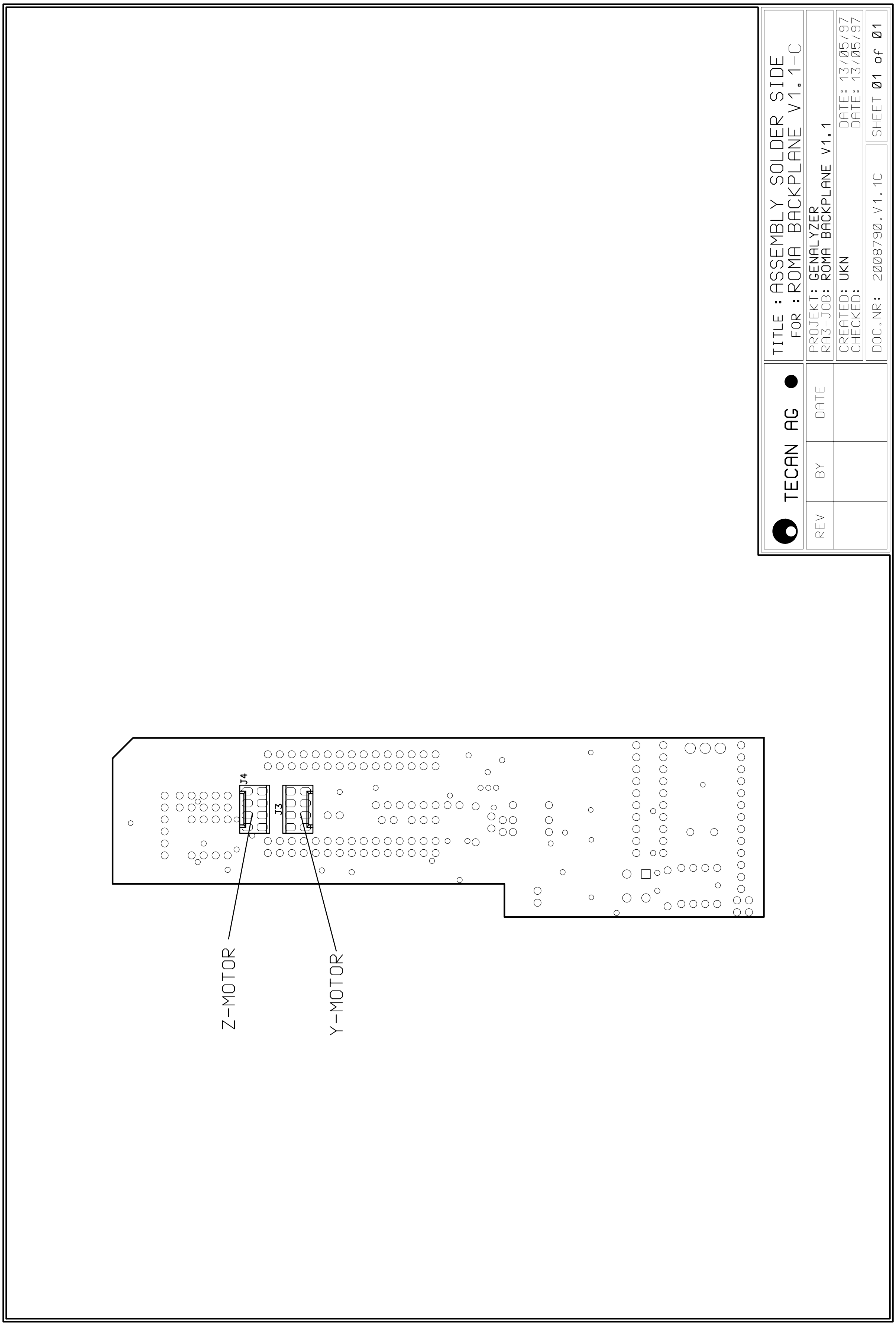
2008790 V.1.1C Schematics


TITLE: SCHEMATICS
FOR : ROMA BACKPLANE V1.1-C
CORRESPONDING ASSEMBLY DOC.Nr: 02008790
PROJECT: GENALYZER
RA3-JOB: GENALYZER ROMA-BP V1.1-C
CREATED: URS KNECHT DATE : 13/05/1997
CHECKED: DATE : 13/05/1997
DOC.Nr: 2008790.V1.1C
SHEET 01 of 01
TECAN AG
REV
BY
DATE
Y-MOTOR
DUBOX2*4S
ROTATION MOTOR
Z-MOTOR
DUBOX2*4S
GRIPPER MOTOR
RN1
RN2
R4 10K
R3 10K
R2 10K
R1 10K
C3 470pF
C4 470pF
MOT+G
MOT-G
MOT+R
MOT-R
ENCA-G
ENCB-G
ENCB-R
ENCA-R
VCC
GND
MO4
MO3
IN4
IN3
DOUT2
DOUT1
FLEX to GRIPPER
BUS END
J7
J8
JUMPER SET
1-2
2-3
J7
D-IN
CAN
J8
D-IN
CAN
default
CAN-L / IN2
CAN-H / IN1
POUT2
POUT1
RN3a 10K
RN3b 10K
RN3c 10K
RN3d 10K
Q1 IRLD014
Q2 IRLD014
Q3 VN610L
Q4 VN610L
C5 470pF
C6 470pF
IC1 LM2574-5
VIN
FBACK
VOUT
GND
ON/OFF
PGND
L1 680uH-0.5A
D3 SB040
C1 150uF35V-HFQ-L
C2 330uF10V-HFQ
J1
J9
TP1
TP2
TP3
M31
M32
DUBOX1*13S
FLEX to OPTIBO
Z-BREAK
TEST-POINTS
FIXING
VPP
VCC
GND
PGND

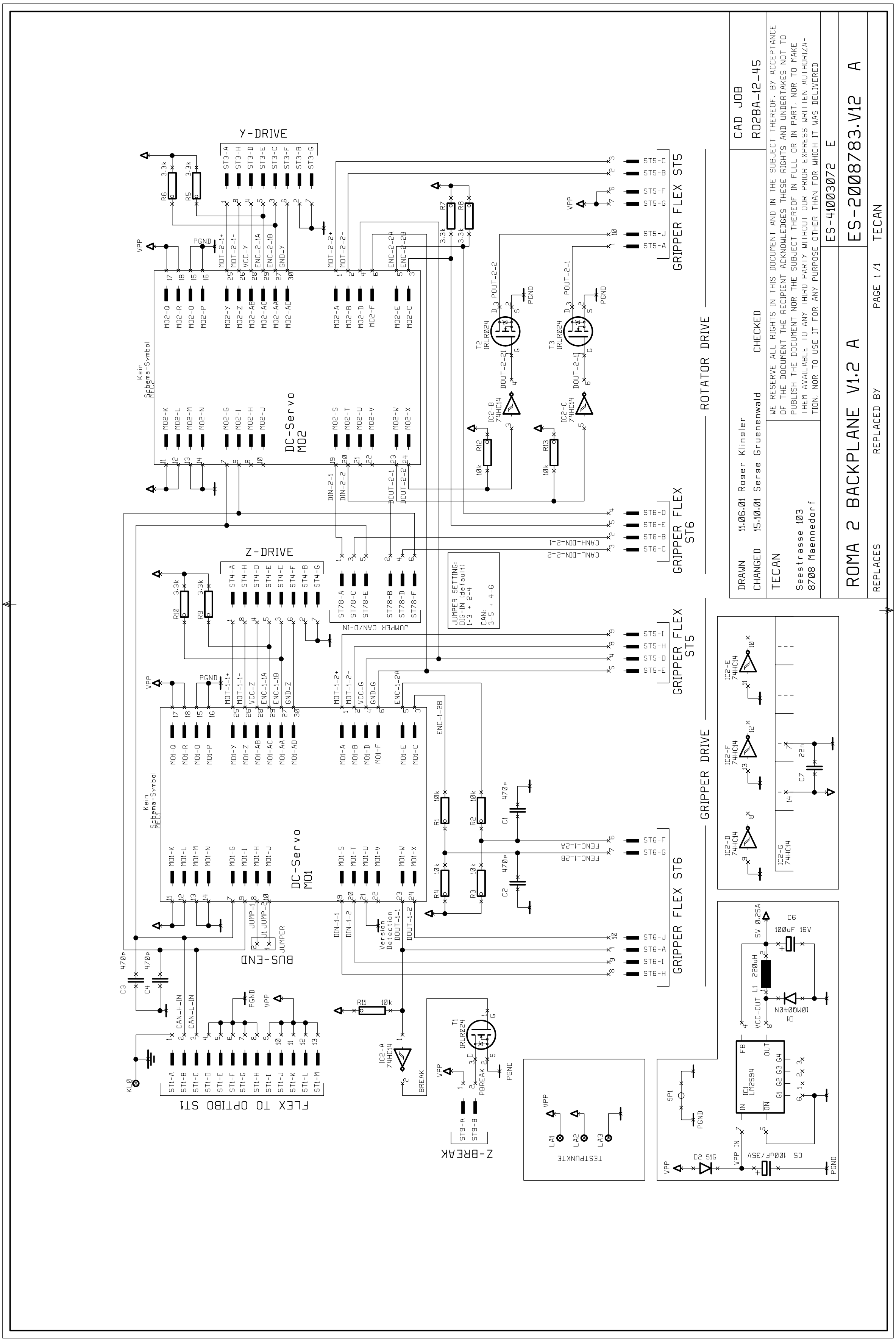
2008790 V.1.1C Assembly component side


TITLE : ASSEMBLY COMPONENT SIDE
FOR : ROMA BACKPLANE V1.1-C
TECAN AG
PROJEKT: GENALYZER
RA3-JOB: ROMA BACKPLANE V1.1
CREATED: UKN
CHECKED:
DATE: 13/05/97
DATE: 13/05/97
DOC.NR: 2008790.V1.1C
SHEET 01 of 01
REV
BY
DATE
DC-SERVO :
Z-MOTOR & G-MOTOR ADR 7
Y-MOTOR & R-MOTOR ADR 6
Z-MOTOR
Y-MOTOR
Z-BREAK (activ)
BUS END
EXTENDET FUNCTION
CAN or DIGITAL IN
FLEX TO GRIPPER
TESTPOINTS
FLEX TO GENESIS CU
DC-SERVO2 : ADR 6
MOT1 = Y-MOTOR
MOT2 = ROTATOR-MOTOR
DC-SERVO1 : ADR 7
MOT1 = Z-MOTOR
MOT2 = GRIPPER-MOTOR
DC-MOLO
ROMA BACKPLANE V1.0
MO1
MO2
MO3
MO4
Q1
Q2
Q3
Q4
RN1
RN2
RN3
R1
R2
R3
R4
C1
C2
C3
C4
C5
C6
IC1
L1
D1
J1
J2
J5
J6
J7
J8
J9
BUSEND
CAN
GRIPPER-FLEX
TP1
TP2
TP3
VPP
VCC
GND
M1

2008790 V.1.1C Assembly solder side


TITLE : ASSEMBLY SOLDER SIDE
FOR : ROMA BACKPLANE V1.1-C
PROJEKT: GENALYZER
RA3-JOB: ROMA BACKPLANE V1.1
CREATED: UKN
CHECKED:
DATE: 13/05/97
DATE: 13/05/97
DOC.NR: 2008790.V1.1C
SHEET 01 of 01
TECAN AG
REV
BY
DATE
J4
J3
Z-MOTOR
Y-MOTOR

2008783 V1.2A Schematics


Y-DRIVE
Z-DRIVE
DC-Servo M02
DC-Servo M01
Kein Schema-Symbol
ROTATOR DRIVE
GRIPPER DRIVE
GRIPPER FLEX ST5
GRIPPER FLEX ST6
JUMPER CAN/D-IN
JUMPER SETTING: DIG-IN (default) 1-3 + 2-4 CAN: 3-5 + 4-6
BUS-END
FLEX TO OPTIBO ST1
Z-BREAK
TESTPUNKTE
VPP
PGND
IC1 LM2594
L1 220uH
D1 10MQ040N
C6 100uF 16V
C5 100uF/35V
D2 S1G
5V 0.25A
T1 IRLR024
T2 IRLR024
T3 IRLR024
IC2-A 74HC14
IC2-B 74HC14
IC2-C 74HC14
IC2-D 74HC14
IC2-E 74HC14
IC2-F 74HC14
IC2-G 74HC14
CAD JOB
R02BA-12-45
DRAWN 11.06.01 Roger Klingler
CHANGED 15.10.01 Serge Gruenenwald
CHECKED
TECAN
Seestrasse 103
8708 Maennedorf
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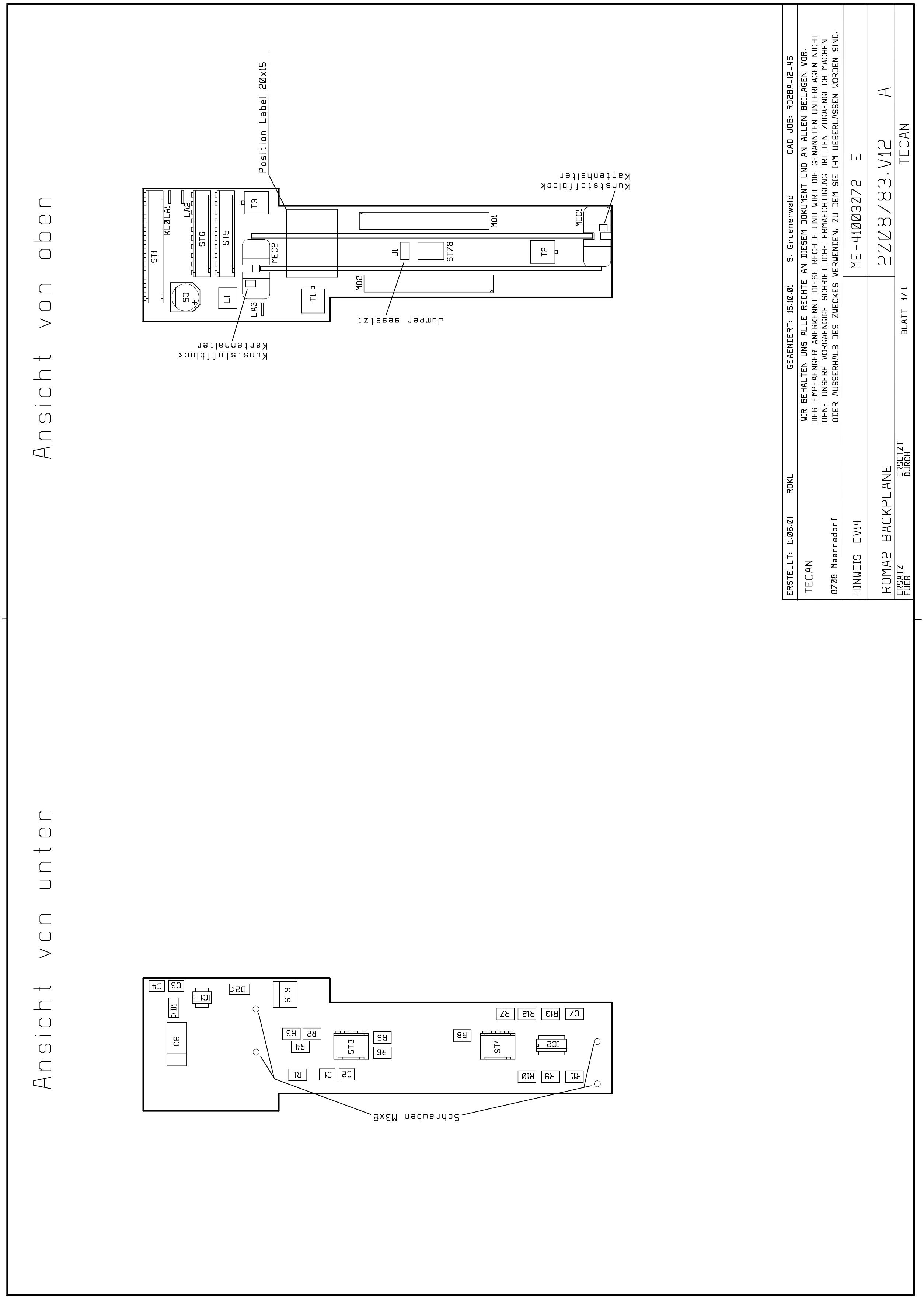
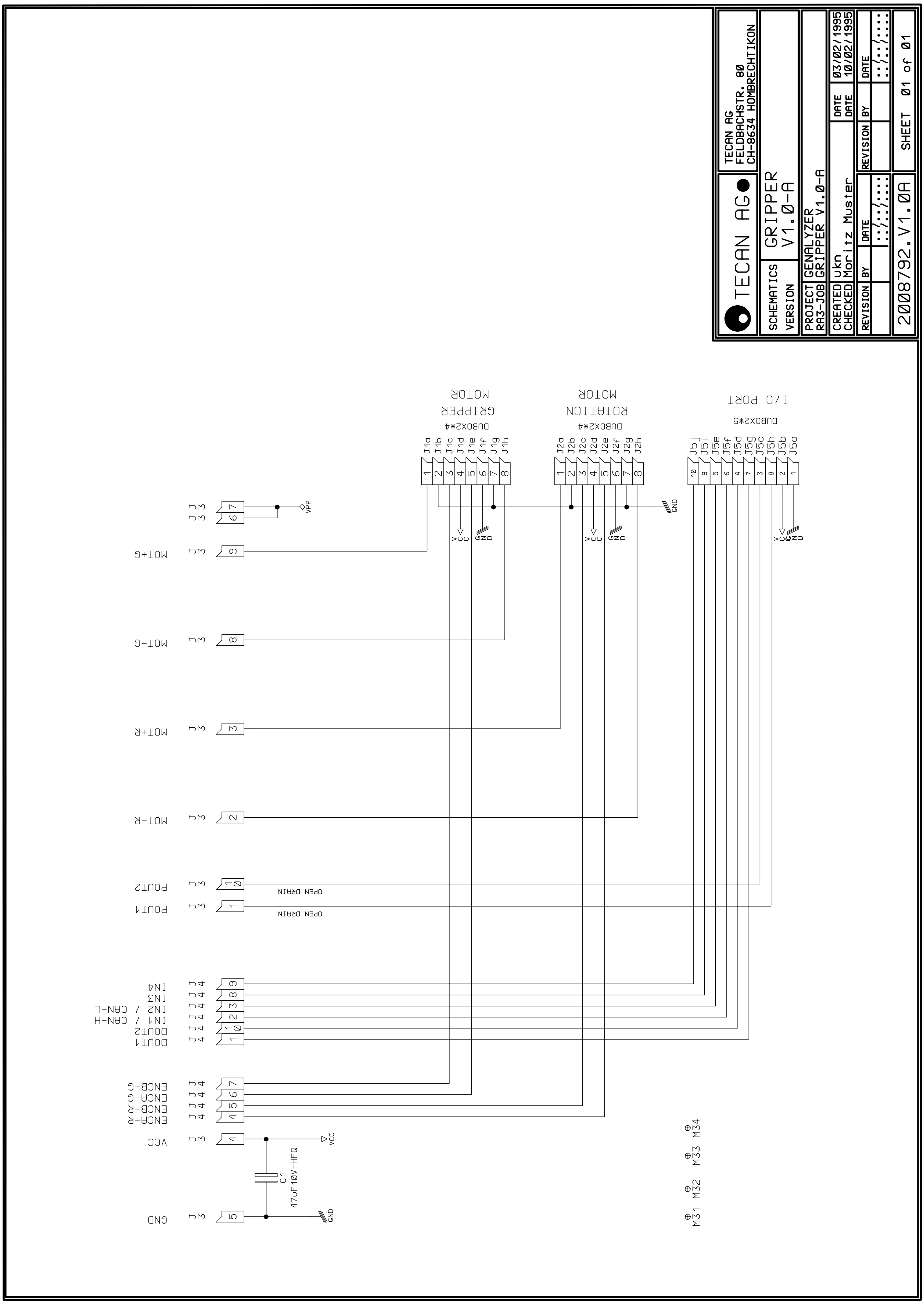
ES-41003072 E
ROMA 2 BACKPLANE V1.2 A
ES-2008783.V12 A
REPLACES
REPLACED BY
PAGE 1/1
TECAN

2008783 V1.2A Assembly

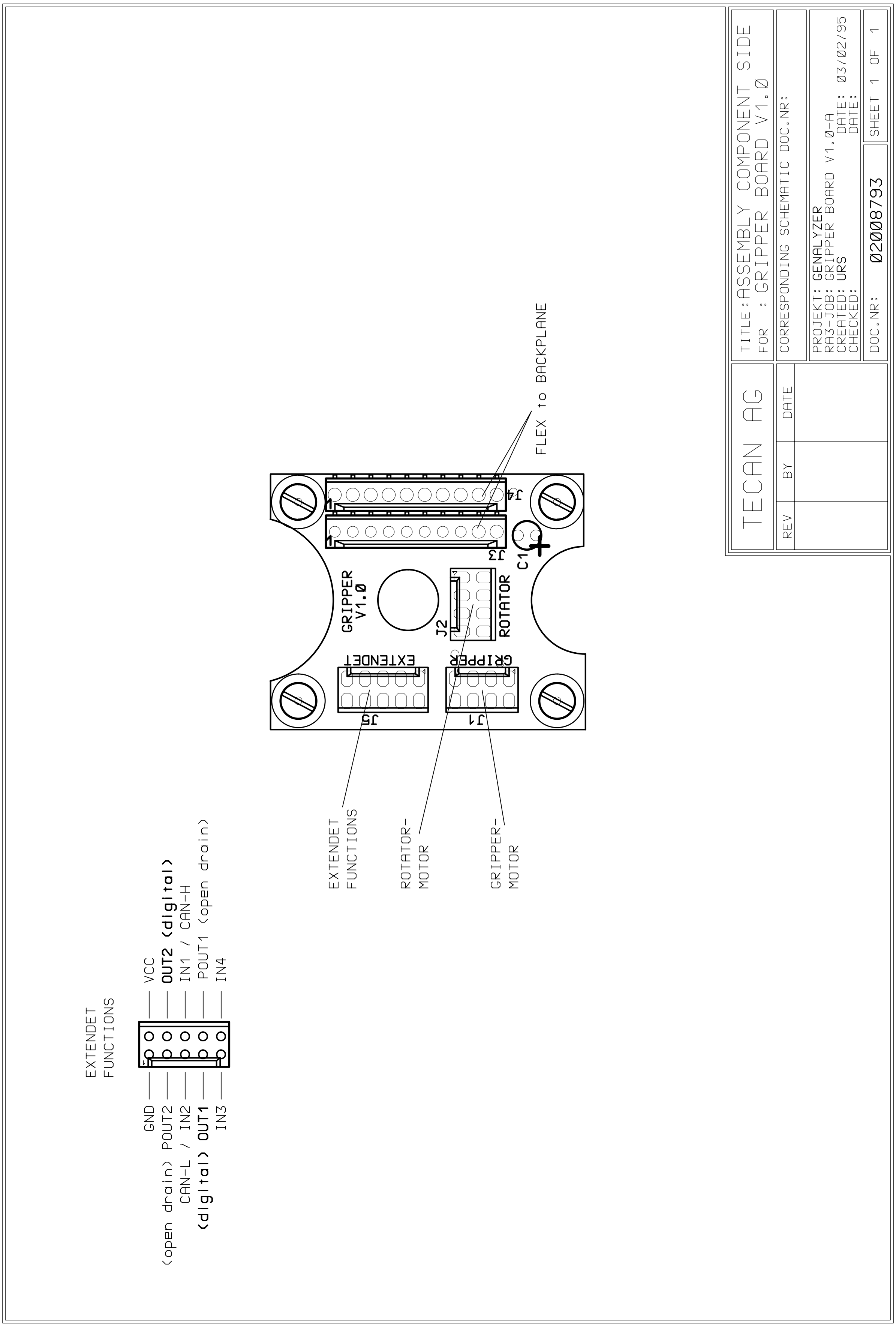

Ansicht von oben
Position Label 20x15
Kunststoffblock
Kartenhalter
ST1
KL0LA1
LA2
ST6
ST5
T3
MEC2
J1
ST78
MO1
MEC1
T2
MO2
C5
L1
LA3
T1
Jumper gesetzt
Kunststoffblock
Kartenhalter
Ansicht von unten
C4
C3
IC1
D2
ST9
D1
C6
R3
R2
R4
ST3
R5
R6
R8
ST4
IC2
R7
R12
R13
C7
R1
C1
C2
R10
R9
R11
Schrauben M3x8
ERSTELLT: 11.06.01
ROKL
GEAENDERT: 15.10.01
S. Gruenenwald
CAD JOB: RO2BA-12-45
TECAN
8708 Maennedorf
HINWEIS EV14
ME-41003072 E
ROMA2 BACKPLANE
2008783.V12 A
ERSATZ FUER
ERSETZT DURCH
BLATT 1/1
TECAN

WIR BEHALTEN UNS ALLE RECHTE AN DIESEM DOKUMENT UND AN ALLEN BEILAGEN VOR. DER EMPFAENGER ANERKENNT DIESE RECHTE UND WIRD DIE GENANNTEN UNTERLAGEN NICHT OHNE UNSERE VORGAENGIGE SCHRIFTLICHE ERMAECHTIGUNG DRITTEN ZUGAENGLICH MACHEN ODER AUSSERHALB DES ZWECKES VERWENDEN, ZU DEM SIE IHM UEBERLASSEN WORDEN SIND.

2008794 V.1.0A Schematics


TECAN AG
TECAN AG
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON
SCHEMATICS
GRIPPER
VERSION
V1.0-A
PROJECT GENALYZER
RA3-JOB GRIPPER V1.0-A
CREATED ukn
CHECKED Moritz Muster
DATE 03/02/1995
DATE 10/02/1995
REVISION BY DATE
2008792.V1.0A
SHEET 01 of 01
MOTOR GRIPPER
DUBOX2*4
MOTOR ROTATION
DUBOX2*4
I/O PORT
DUBOX2*5
VPP
VCC
GND
MOT+G
MOT-G
MOT+R
MOT-R
POUT2
POUT1
OPEN DRAIN
IN4
IN3
IN2 / CAN-L
IN1 / CAN-H
DOUT2
DOUT1
ENCB-G
ENCA-G
ENCB-R
ENCA-R
VCC
GND
C1
47uF10V-HFQ
M31
M32
M33
M34

2008794 V.1.0A Assembly component side


TITLE: ASSEMBLY COMPONENT SIDE
FOR : GRIPPER BOARD V1.0
CORRESPONDING SCHEMATIC DOC.NR:
PROJEKT: GENALYZER
RA3-JOB: GRIPPER BOARD V1.0-A
CREATED: URS
CHECKED:
DATE: 03/02/95
DATE:
SHEET 1 OF 1
DOC.NR: 02008793
TECAN AG
REV
BY
DATE
FLEX to BACKPLANE
J4
J3
C1
GRIPPER
V1.0
J2
ROTATOR
EXTENDET
GRIPPER
J5
J1
EXTENDET FUNCTIONS
ROTATOR-MOTOR
GRIPPER-MOTOR
EXTENDET FUNCTIONS
VCC
OUT2 (digital)
IN1 / CAN-H
POUT1 (open drain)
IN4
GND
(open drain) POUT2
CAN-L / IN2
(digital) OUT1
IN3

9.6 PosID 1 and PosID 2

Find the following diagrams filed hereafter:

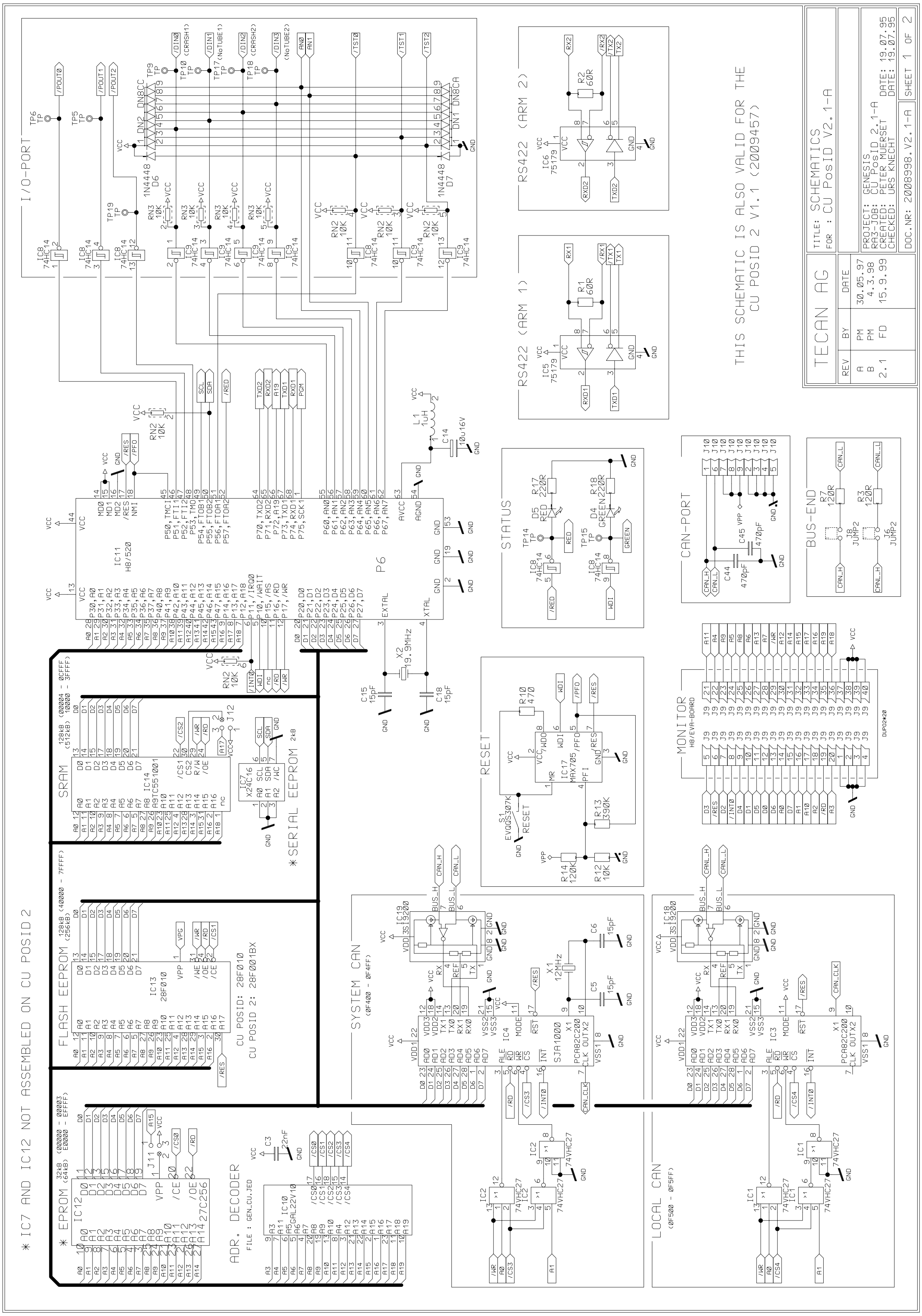
PosID CU Board

Drawing No	Title	Valid for	Page
2008998 V2.1A p.1	Schematics	PosID 1and 2	9 – 65
2008998 V2.1A p.2	Schematics	PosID 1and 2	9 – 66
2008998 V2.1A	Assembly component side	PosID 1and 2	9 – 67

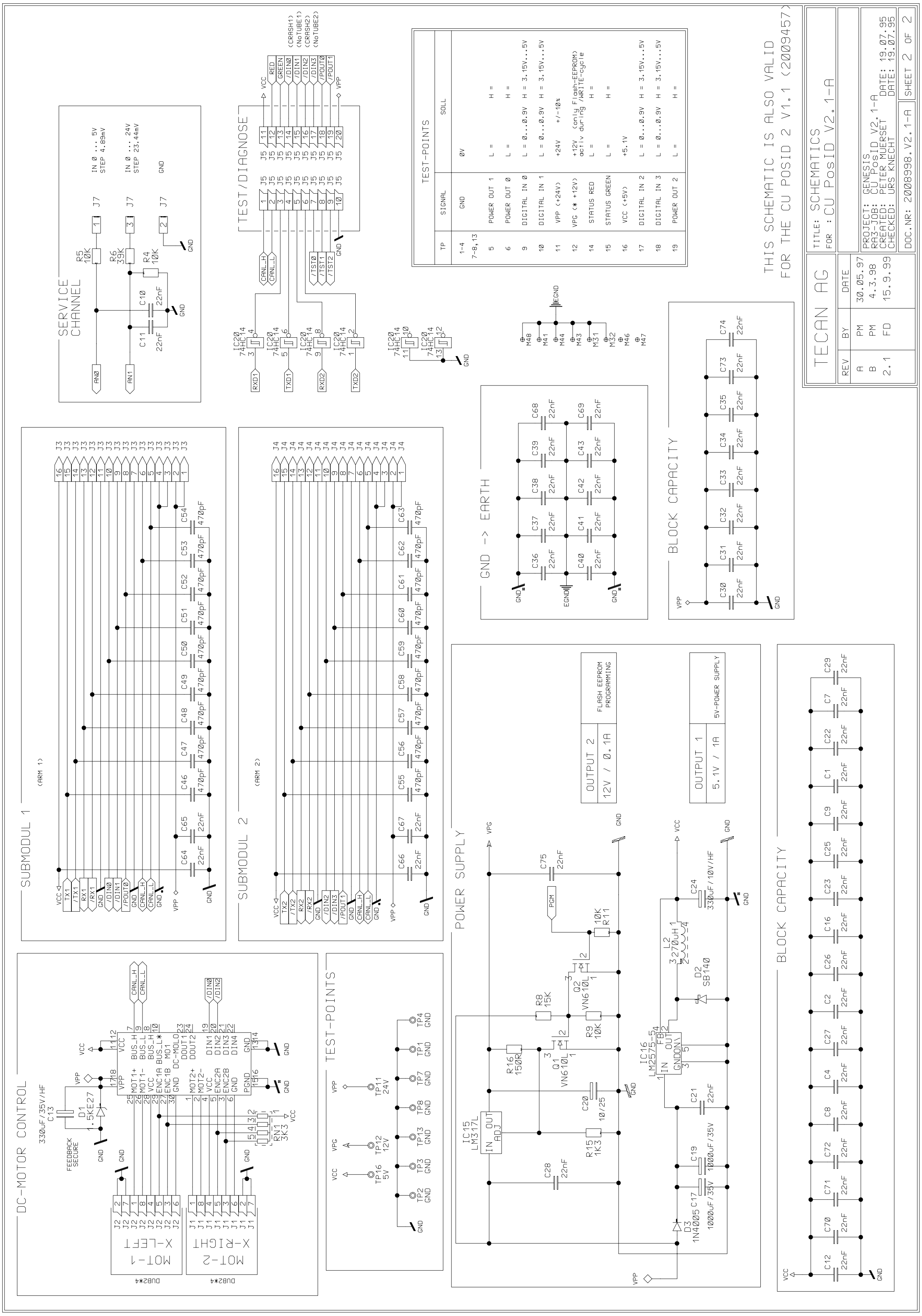
Y/B Board

Drawing No	Title	Valid for	Page
2008518 V1.0B	Schematics	PosID 1and 2	9 – 68
2008519 V1.0B	Assembly	PosID 1and 2	9 – 69
2009458 V1.0A	Schematics	PosID 1and 2	9 – 70
2009458 V1.0A	Assembly	PosID 1and 2	9 – 71

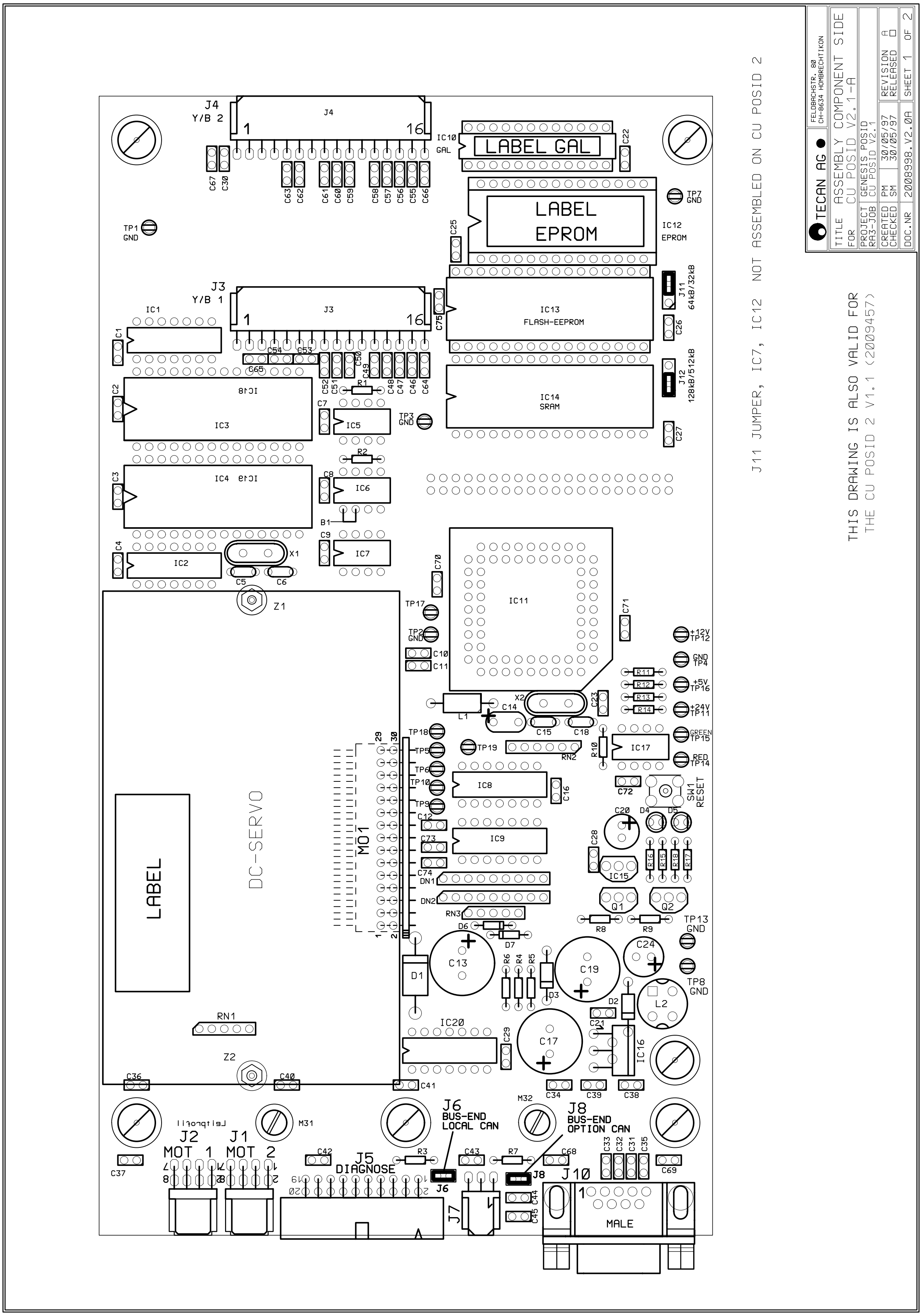
2008998 V2.1A p.1 Schematics


I/O-PORT
RS422 (ARM 2)
RS422 (ARM 1)
THIS SCHEMATIC IS ALSO VALID FOR THE CU POSID 2 V1.1 (2009457)
TECAN AG
REV BY DATE
A PM 30.05.97
B PM 4.3.98
2.1 FD 15.9.99
TITLE: SCHEMATICS
FOR : CU PosID V2.1-A
PROJECT: GENESIS
RA3-JOB: CU PosID 2.1-A
CREATED: PETER MUERSET DATE: 19.07.95
CHECKED: URS KNECHT DATE: 19.07.95
DOC.NR: 2008998.V2.1-A
SHEET 1 OF 2
STATUS
CAN-PORT
BUS-END
MONITOR
H8/EVA-BOARD
RESET
IC11 H8/520
SRAM
SERIAL EEPROM
FLASH EEPROM
CU POSID: 28F010
CU POSID 2: 28F001BX
* IC7 AND IC12 NOT ASSEMBLED ON CU POSID 2
* EPROM
ADR. DECODER
FILE : GEN_CU.JED
SYSTEM CAN
(0F400 - 0F4FF)
LOCAL CAN
(0F500 - 0F5FF)
IC4 SJA1000
IC3
IC13 28F010
IC14 CXK581001
IC12 27C256
IC10 GAL22V10
IC17 MAX705
IC7 X24C16
IC19 SI9200
IC18 SI9200
X1 12MHz
X2 19.6MHz
L1 1uH
C14 10u16V

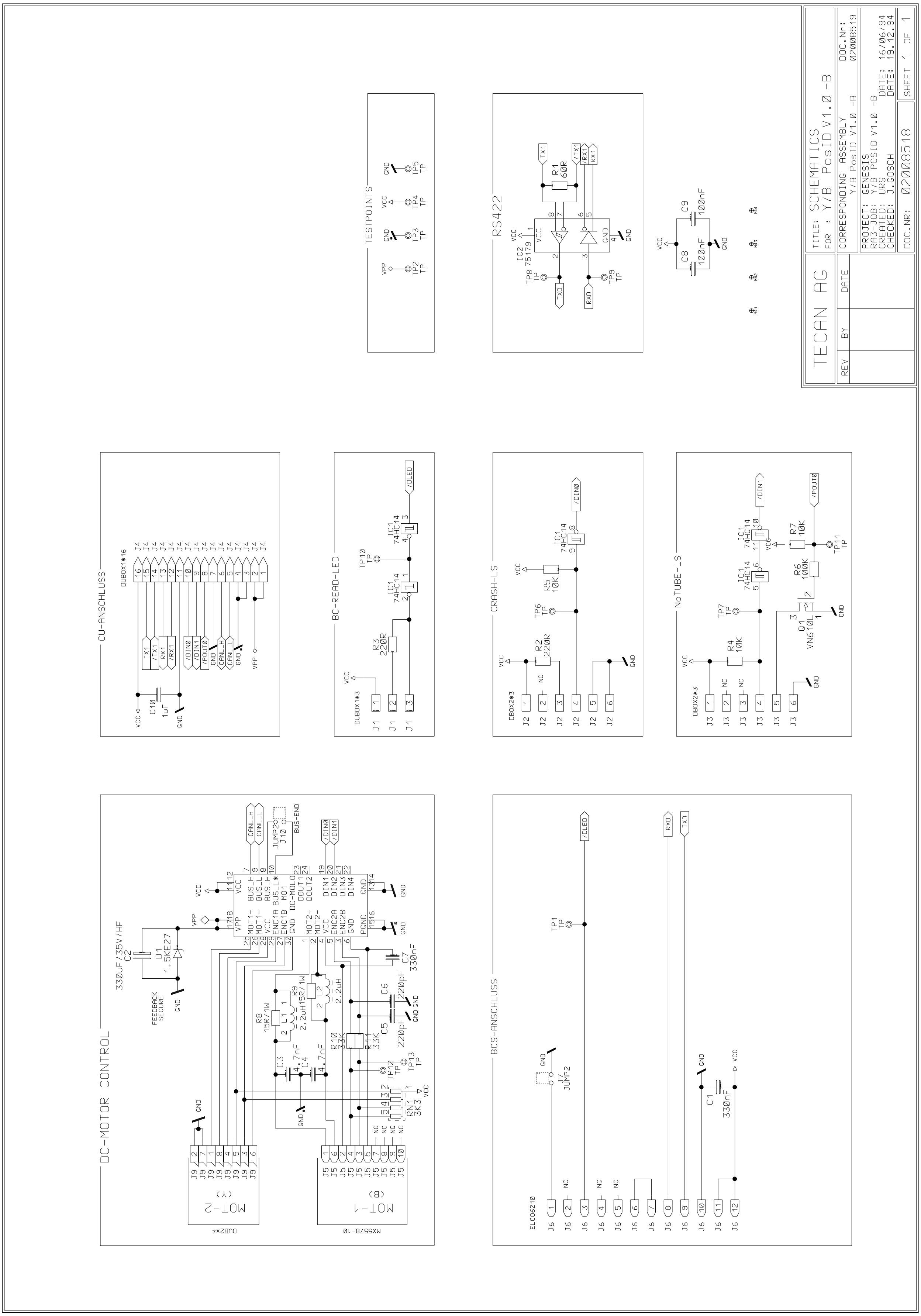
2008998 V2.1A p.2 Schematics


SERVICE CHANNEL
TEST/DIAGNOSE
TEST-POINTS
THIS SCHEMATIC IS ALSO VALID FOR THE CU POSID 2 V1.1 (2009457)
TITLE: SCHEMATICS
FOR : CU PosID V2.1-A
TECAN AG
REV BY DATE
A PM 30.05.97
B PM 4.3.98
2.1 FD 15.9.99
PROJECT: GENESIS
RA3-JOB: CU PosID V2.1-A
CREATED: PETER MUERSET DATE: 19.07.95
CHECKED: URS KNECHT DATE: 19.07.95
DOC.NR: 2008998.V2.1-A
SHEET 2 OF 2
TP SIGNAL SOLL
1-4 7-8,13 GND 0V
5 POWER OUT 1 L = H =
6 POWER OUT 0 L = H =
9 DIGITAL IN 0 L = 0...0.9V H = 3.15V...5V
10 DIGITAL IN 1 L = 0...0.9V H = 3.15V...5V
11 VPP (+24V) +24V +/-10%
12 VPG (* +12V) +12V (only Flash-EEPROM) activ during /WRITE-cycle L = H =
14 STATUS RED L = H =
15 STATUS GREEN L = H =
16 VCC (+5V) +5.1V
17 DIGITAL IN 2 L = 0...0.9V H = 3.15V...5V
18 DIGITAL IN 3 L = 0...0.9V H = 3.15V...5V
19 POWER OUT 2 L = H =
GND -> EARTH
BLOCK CAPACITY
SUBMODUL 1 (ARM 1)
SUBMODUL 2 (ARM 2)
POWER SUPPLY
OUTPUT 2 12V / 0.1A FLASH EEPROM PROGRAMMING
OUTPUT 1 5.1V / 1A 5V-POWER SUPPLY
DC-MOTOR CONTROL
MOT-1 X-LEFT
MOT-2 X-RIGHT
IC15 LM317L
IC16 LM2575-5
IC20 74HC14
Q1 VN610L
Q2 VN610L
D1 1.5KE27
D2 SB140
D3 1N4005
L2 330uH
RN1 3K3
C13 330uF/35V/HF
C24 330uF/10V/HF
C19 1000uF/35V
C17 1000uF/35V
VCC VPP VPG GND EGND

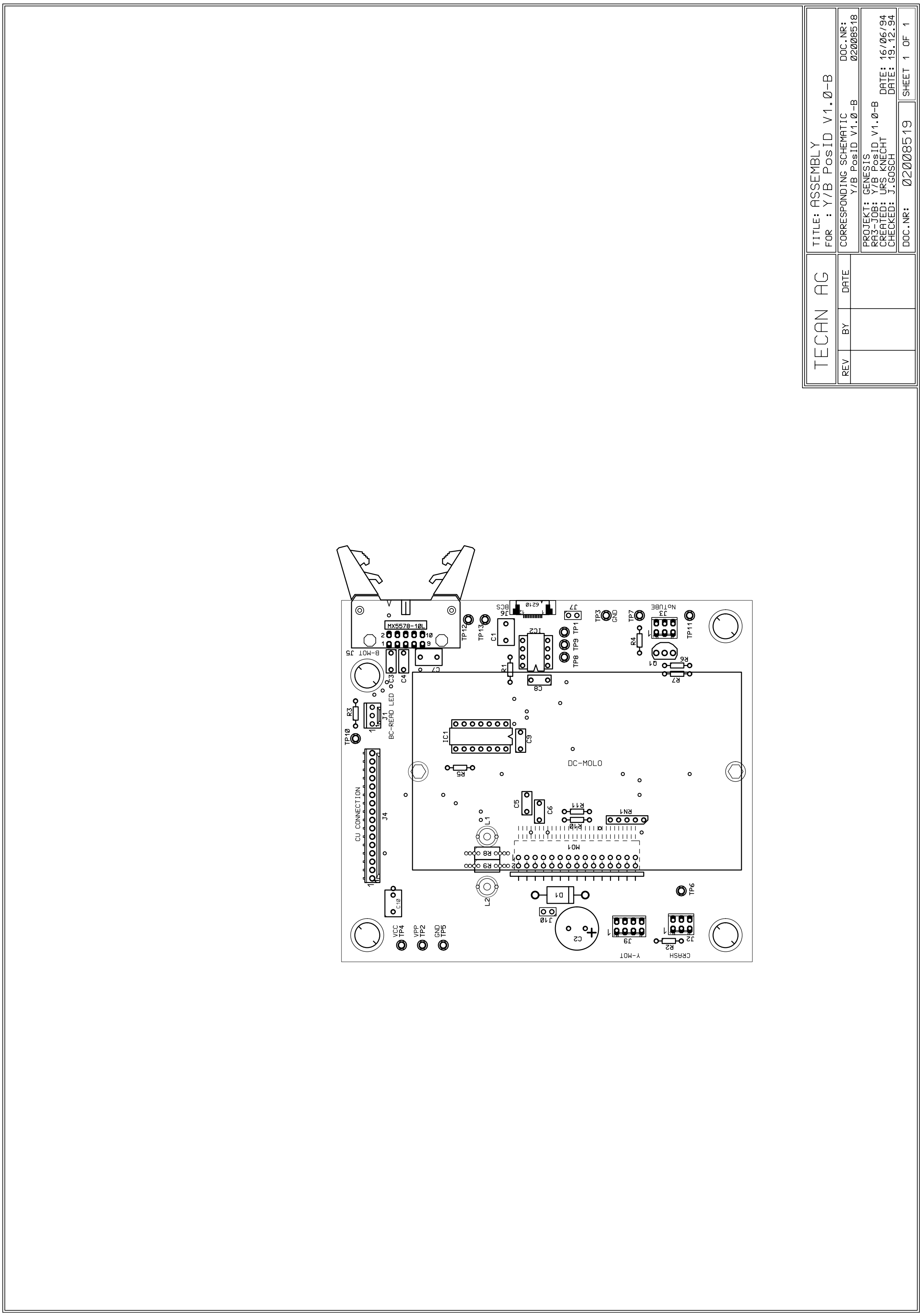
2008998 V2.1A Assembly component side


J11 JUMPER, IC7, IC12 NOT ASSEMBLED ON CU POSID 2
THIS DRAWING IS ALSO VALID FOR
THE CU POSID 2 V1.1 (2009457)
TECAN AG
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON
TITLE ASSEMBLY COMPONENT SIDE
FOR CU POSID V2.1-A
PROJECT GENESIS POSID
RA3-JOB CU POSID V2.1
CREATED PM 30/05/97
CHECKED SM 30/05/97
REVISION A
RELEASED
DOC.NR 2008998.V2.0A
SHEET 1 OF 2
J4 Y/B 2
J3 Y/B 1
IC10 GAL
LABEL GAL
LABEL EPROM
IC12 EPROM
IC13 FLASH-EEPROM
IC14 SRAM
J11 64kB/32kB
J12 128kB/512kB
TP7 GND
TP1 GND
TP3 GND
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC11
IC15
IC16
IC17
IC18
IC19
IC20
X1
X2
Z1
Z2
L1
L2
Q1
Q2
D1
D2
D3
D4
D5
D6
D7
DN1
DN2
RN1
RN2
RN3
M01
M31
M32
DC-SERVO
LABEL
+12V TP12
GND TP4
+5V TP16
+24V TP11
GREEN TP15
RED TP14
SW1 RESET
TP13 GND
TP8 GND
TP17
TP2 GND
TP18
TP19
TP5
TP6
TP10
TP9
J2 MOT 1
J1 MOT 2
Leiterbild
J5 DIAGNOSE
J6 BUS-END LOCAL CAN
J7
J8 BUS-END OPTION CAN
J10 MALE
C13
C17
C19
C24
C20
C28

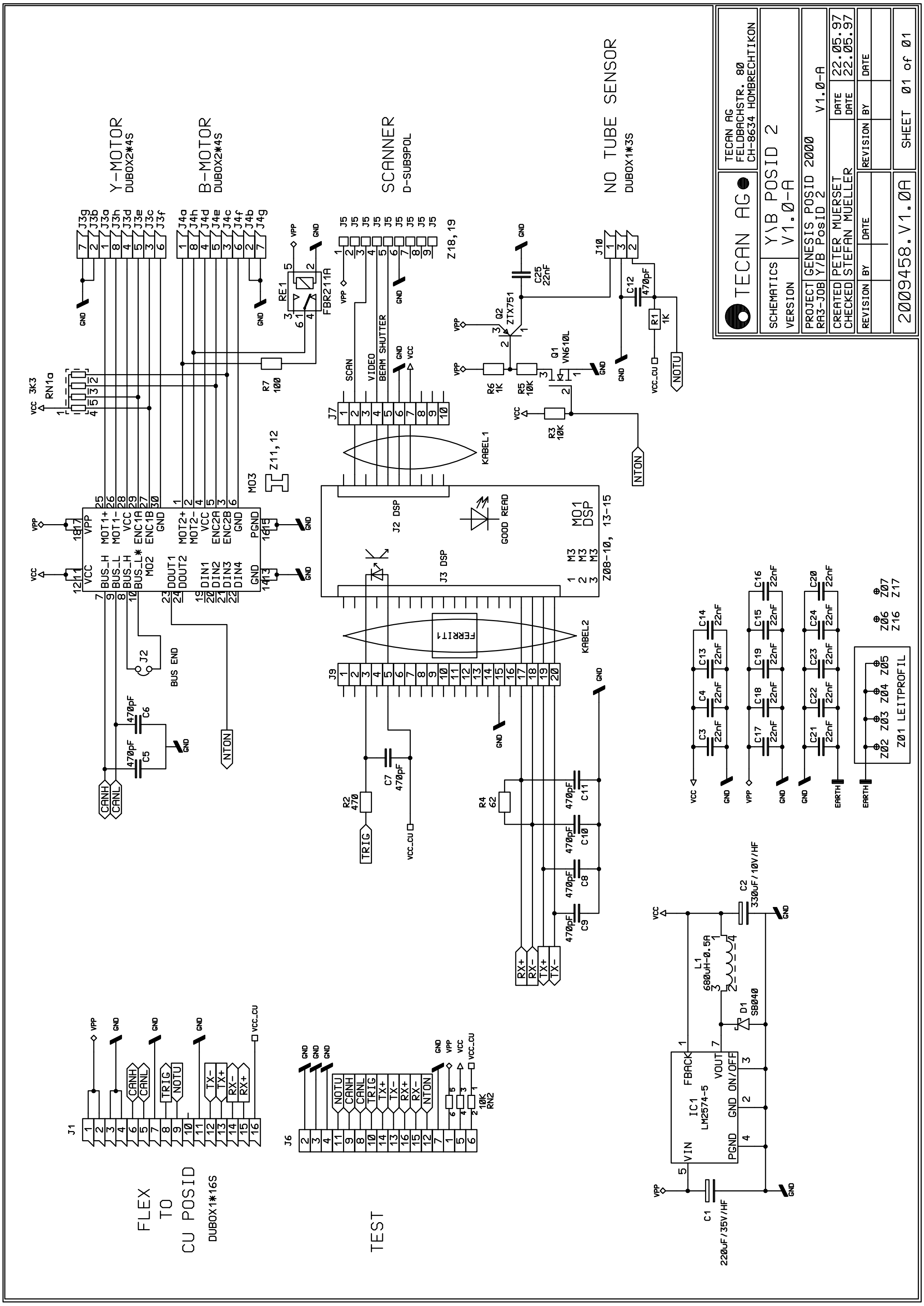
2008518 V1.0B Schematics


TESTPOINTS
VPP
GND
VCC
TP2
TP3
TP4
TP5
RS422
IC2 75179
R1 60R
TX1
/TX1
RX1
TXD
RXD
TP8
TP9
C8 100nF
C9 100nF
CU-ANSCHLUSS
DUBOX1*16
C10 1uF
BC-READ-LED
R3 220R
IC1 74HC14
TP10
/DLED
CRASH-LS
R2 220R
R5 10K
TP6
/DIN0
NoTUBE-LS
R4 10K
R6 100K
R7 10K
Q1 VN610L
TP7
TP11
/DIN1
/POUT0
DC-MOTOR CONTROL
C2 330uF/35V/HF
D1 1.5KE27
FEEDBACK SECURE
R8 15R/1W
R9 15R/1W
L1 2.2uH
L2 2.2uH
C3 4.7nF
C4 4.7nF
C5 220pF
C6 220pF
C7 330nF
R10 33K
R11 33K
RN1 3K3
TP12
TP13
JUMP2 J10
BUS-END
CANL_H
CANL_L
MOT-2 (Y)
MOT-1 (B)
DUB2*4
MX5578-10
BCS-ANSCHLUSS
ELCO6210
J7 JUMP2
TP1
C1 330nF
TECAN AG
REV
BY
DATE
TITLE: SCHEMATICS
FOR : Y/B PosID V1.0 -B
DOC.Nr: 02008519
CORRESPONDING ASSEMBLY
Y/B PosID V1.0 -B
PROJECT: GENESIS
PROJECT: Y/B POSID V1.0 -B
CREATED: URS
CHECKED: J.GOSCH
DATE: 16/06/94
DATE: 19.12.94
DOC.NR: 02008518
SHEET 1 OF 1

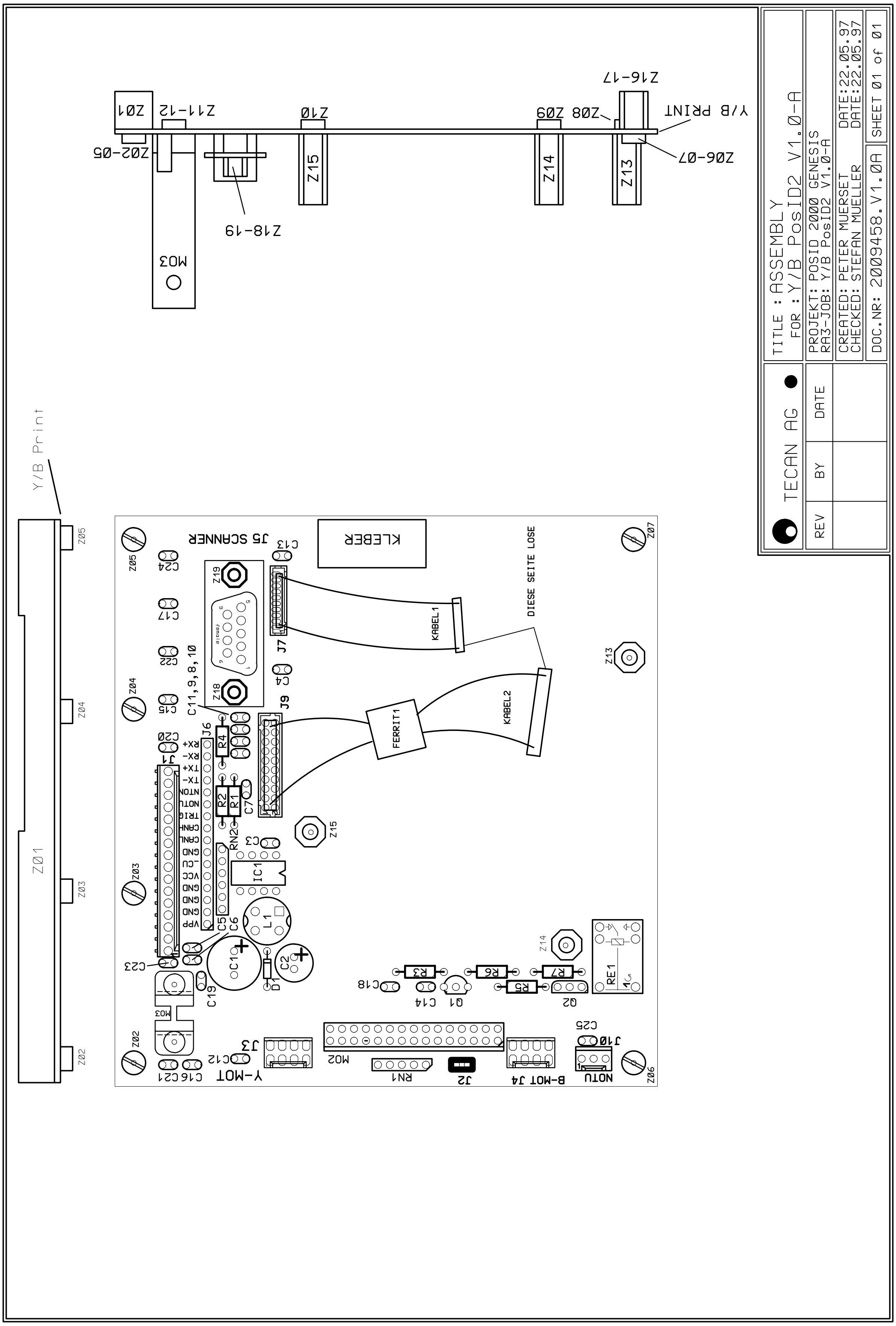
2008519 V1.0B Assembly


TITLE: ASSEMBLY
FOR : Y/B PosID V1.0-B
DOC.NR: 02008518
CORRESPONDING SCHEMATIC Y/B PosID V1.0-B
PROJEKT: GENESIS
RA3-JOB: Y/B PosID V1.0-B
CREATED: URS.KNECHT
CHECKED: J.GOSCH
DATE: 16/06/94
DATE: 19.12.94
SHEET 1 OF 1
DOC.NR: 02008519
TECAN AG
REV
BY
DATE
MX5578-10L
B-MOT J5
C3
C4
C7
TP12
TP13
C1
BCS
J6
IC2
R1
C8
J7
TP1
TP9
TP8
TP3
GND
TP7
R4
NoTUBE
J3
TP11
Q1
R6
R7
R3
J1
BC-READ LED
TP10
IC1
C9
DC-MOLO
R5
CU CONNECTION
J4
C5
C6
R11
R10
RN1
L1
MO1
R8
R9
L2
D1
TP6
C10
J10
C2
J9
Y-MOT
J2
R2
CRASH
VCC TP4
VPP TP2
GND TP5

2009458 V1.0A Schematics


TECAN AG
TECAN AG
FELDBACHSTR. 80
CH-8634 HOMBRECHTIKON
SCHEMATICS
VERSION
Y\B POSID 2
V1.0-A
PROJECT GENESIS POSID 2000
RA3-JOB Y/B PosID 2
V1.0-A
CREATED PETER MUERSET
CHECKED STEFAN MUELLER
DATE 22.05.97
DATE 22.05.97
REVISION
BY
DATE
2009458.V1.0A
SHEET 01 of 01
Y-MOTOR
DUBOX2*4S
B-MOTOR
DUBOX2*4S
SCANNER
D-SUB9POL
NO TUBE SENSOR
DUBOX1*3S
RN1a
3K3
RE1
FBR211A
R7
100
Z11,12
M03
J7
KABEL1
J2 DSP
J3 DSP
GOOD READ
M01
DSP
Z08-10, 13-15
Z18,19
SCAN
VIDEO
BEAM SHUTTER
Q2
ZTX751
Q1
VN610L
R6
1K
R5
10K
R3
10K
R1
1K
C25
22nF
C12
470pF
J10
NOTU
NTON
VCC_CU
BUS END
J2
C5
470pF
C6
470pF
CANH
CANL
NTON
J9
FERRIT1
KABEL2
C7
470pF
R2
470
TRIG
R4
62
C8
C9
C10
C11
470pF
RX+
RX-
TX+
TX-
C3
C4
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
22nF
Z01 LEITPROFIL
Z02 Z03 Z04 Z05
Z06 Z07
Z16 Z17
EARTH
C2
330uF/10V/HF
L1
680uH-0.5A
D1
SB040
IC1
LM2574-5
VIN
FBACK
VOUT
GND ON/OFF
PGND
C1
220uF/35V/HF
J1
FLEX
TO
CU POSID
DUBOX1*16S
J6
TEST
RN2
10K
VPP
VCC
GND
BUS_H
BUS_L
BUS_L*
MO2
DOUT1
DOUT2
DIN1
DIN2
DIN3
DIN4
MOT1+
MOT1-
ENC1A
ENC1B
MOT2+
MOT2-
ENC2A
ENC2B
PGND

2009458 V1.0A Assembly


TITLE : ASSEMBLY
FOR : Y/B PosID2 V1.0-A
PROJEKT: POSID 2000 GENESIS
RA3-JOB: Y/B PosID2 V1.0-A
CREATED: PETER MUERSET
CHECKED: STEFAN MUELLER
DATE:22.05.97
DATE:22.05.97
DOC.NR: 2009458.V1.0A
SHEET 01 of 01
TECAN AG
REV
BY
DATE
Z01
Z11-12
Z10
Z09
Z08
Z16-17
Y/B PRINT
Z02-05
Z06-07
Z15
Z14
Z13
Z18-19
M03
Y/B Print
Z05
Z04
Z03
Z02
Z07
Z06
KLEBER
J5 SCANNER
DIESE SEITE LOSE
KABEL1
KABEL2
FERRIT1
Z19
Z18
J7
J9
J6
J1
C11,9,8,10
C13
C24
C17
C22
C15
C20
C4
RX+
RX-
TX+
TX-
NTON
NOTU
TRIG
CANH
CANL
GND
CU-
VCC
GND
GND
GND
VPP
R4
R2
R1
C7
RN2
C3
IC1
C5
C6
L1
C1
C2
D1
C19
C23
R3
R6
R7
R5
C18
C14
Q1
Q2
RE1
C25
J10
J3
C12
C16
C21
Y-MOT
M02
RN1
J2
B-MOT J4
NOTU